LIVE STOCK HANDBOOKS.

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NO. IV.

CATTLE.

BREEDS AND MANAGEMENT

BY

WILLIAM HOUSMAN.

WITH A CHAPTER ON DISEASES OF CATTLE,
BY PROFESSOR J. WORTLEY AXE.

FORTY ILLUSTRATIONS.

EIGHTH EDITION.

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CATTLE.

BREEDS AND MANAGEMENT.

CHAPTER I.

THE OX, WILD AND DOMESTICATED.

(1) ORIGINAL SPECIES.—Gigantic Primeval Oxen—Statements and Opinions of Sir Richard Owen and Professor Boyd Dawkins—Existing Remnants of an Ancient Race—Hornless Varieties.
(2) THE PARK HERDS.—Chillingham — Rütimeyer's Opinion—The Earl of Tankerville's Account of the Herd — Anecdotes and Remarkable Incidents—Distinctive Characteristics—Experiments in Crossing — Weights — Herd of Earl Ferrers at Chartley—Rev. J. Storer's Description — Lyme Park — Polled Cattle at Whalley Abbey — Gisburne Park—Middleton and Gunton—Whitaker's References—Ancient Herd of Guisborough Priory—Rev. H. Berry—Bewick — Wild Cattle at Blakeley—Somerford Polls—East Anglian Herds — Hamilton and Kilmory Herds in Scotland.
(3) CHANGES UNDER DOMESTICATION.—Natural Fixity of Type—Adaptation to Circumstances — Variation under the Hand of Man — Cross-Breeding, Varieties and Species — The Pallasian Theory — Definite Design and Systematic Selection — Distinguished and Obscure Improvers — National and Hereditary Taste—Classification of Breeds.

(1) ORIGINAL SPECIES.

Sir Richard Owen ("Palæontology," 1860) has shown that in the pliocene and pleistocene periods a very large species of ox (*Bos antiquus*) existed in Britain, together with a large bison,

and that the remains of "a somewhat smaller, but still stupendous wild ox" (*Bos primigenius*, called by some authorities *Bos urus*) are found in pleistocene marls of England and Scotland. With the latter was associated "an aboriginal British ox of much smaller stature and with short horns (*Bos longifrons*), which continued to exist until the historical period, and was probably the source of the domesticated cattle of the Celtic race before the Roman invasion." In harmony with the opinion of Owen, Professor Boyd Dawkins has repeatedly shown the high probability that the smallest of these species (Owen's *longifrons*), introduced into Britain in the neolithic age, was the source of all British domesticated cattle, although subsequently more or less crossed with a large race of cattle brought from the Continent of Europe by the Anglo-Saxons. The two gigantic species proved to have existed in ancient Britain are supposed to have become extinct in these islands; yet this supposition has not escaped challenge and dispute. It is needless here to enter into a discussion of subjects of controversy which do not affect the more practical questions which we have to consider in the following chapters and sections of this volume.

Some English parks contain remnants of a wild breed of cattle, white, with black or red markings on the ears, round the muzzles, and sometimes elsewhere. The origin of the park herds is obscure. The question whether the cattle composing them are of unbroken descent from an aboriginal wild race, or have sprung from domesticated cattle, which escaped to the ancient forests and there reverted to the wild state, has been considered but never settled. The prevailing white colour, however, in all of them, and the polled characteristic in some, seem to indicate the interruption of the wild state by a period of domestication, in which variation from the dark or dusky colours, supposed to have belonged to the original wild races of the taurine group, may have occurred, and the horns, by selections from a sport, or from the offspring of a cross, may have been bred off. The disappearance of the

horn, we may reasonably assume, is a variation which had its origin when the conditions of life were not such as to make the horn a necessary weapon of self-defence, for the preservation of the race—that is to say, that the animal was under domestication, and was protected by man, and not in its original wild state, when the horn first disappeared.

(2) The Park Herds.

The foremost and the most representative herd of the wild white cattle is that of the Earl of Tankerville, in Chillingham Park, Northumberland. Professor Rütimeyer, of Basle, reasoning upon similarity of osteological structure, has maintained that the Chillingham cattle are the true descendants of the *urus*, and, upon a comparatively small scale, faithfully represent that gigantic ox. Yet he has observed, and in this the opinion of Nathusius agrees, that the uncommon fineness of the Chillingham bone is not the characteristic of a real wild race. A high British authority, Professor H. Alleyne Nicholson, of Aberdeen University, says that the Chillingham cattle are the nearest approach to British wild oxen.—" Manual of Zoology " (Blackwood, 1887).

Whatsoever their origin, whether wild by unbroken descent from an original wild race, or wild only by reversion, they have the natural instinct of hostility to man, and dread of his power and presence. They have also the instinctive dislike of the society of other cattle. Yet, when the natural aversion towards the domesticated race has been overcome, the crosses have proved fertile. The Earl of Tankerville, in a pamphlet entitled "The Chillingham Wild Cattle," printed at the *Surrey Comet* office, Kingston-upon-Thames, in 1891, has given interesting details of a series of experiments in reciprocal crosses between the wild race and the pedigree Shorthorn.

The wild cattle, we are told, retain to a remarkable extent, in their semi-civilization, the wild habits of their ancestors, retiring to the seclusion of the woods within their extensive

range, and carefully hiding and guarding their young calves. They were little known beyond the circles of the readers of such special works as those of Bewick and George Culley until about sixty years ago, when the pictures of Sir Edwin Landseer brought them into more general notice. The pamphlet contains a narrative of the circumstances which led to Sir Edwin's accompanying its author (then Lord Ossulston) from the Highland haunts of the red deer and the roe to the home of the wild white cattle. Incidentally, any remarkable circumstances associated with the painting of Landseer's famous pictures are very graphically told. The following story, which also appears in Mr. Storer's book on the "Wild White Cattle," with a few additional particulars here incorporated, illustrates the habits of the wild cattle, and at the same time those of the distinguished artist:—

"As soon as we had arrived at what he (Landseer) used to call 'his dear Chillingham,' he at once devoted himself to the wild cattle as keenly as he had done to his beloved deer, observing with his glass for days from some hiding-place, and noting minutely, their ways and characteristics."

When this daily inspection had gone on for some time, the order was given that a bull, for closer study, should be killed. The gates of the lower park being thrown open when the hay-crop was housed, the deer and wild cattle came down in the night from the hilly and wooded wilderness of the upper park to feed upon the aftermath. Here the grassy plain afforded good galloping ground for the horseman who proposed to chase one of the bulls out of the herd and bring him to bay for a fair shot. A keeper (named Barnes), therefore, was sent to watch the herd from his hiding-place, allow the main part to return to their day-time haunts, and close the gates before the bull selected had passed out of the lower park. An early breakfast, preparatory to the consummation of this plan, was interrupted by the head park-keeper, Cole, whose excited exclamation, as he came running across the lawn, conveyed the startling announcement that the wild bull

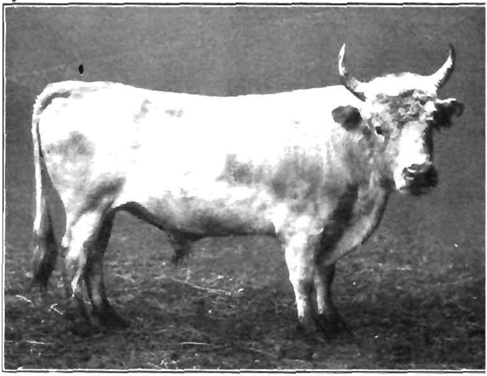
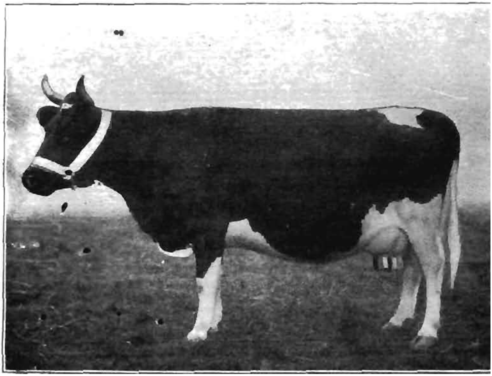


Photo by C. Reid.

CHILLINGHAM BULL.



had caught the keeper, and was at that moment tossing him in the lower park. The narrative proceeds:—

"We jumped up. My father besought me not to take part in the scrimmage that was to follow. I had no difficulty in acceding to this, and so put down my gun, for I knew that Bran" Lord Ossulston's favourite Highland deerhound), "who was sunning himself at the door, was better than any gun on such an occasion. So off we ran, and on rising the hill, as soon as Bran caught sight of the catastrophe in the distance, one point of the finger and he was off with the speed of an arrow. In a moment he was at the bull, and in the next, tearing at his hocks, he forced him to leave his victim and face round, and then firmly held him to his bay (though he several times tried to turn at us, till we got the poor fellow into a cart and sent him home. . . . Of course the bull was forthwith shot, and, together with Bran and the other personages concerned, was the subject of Landseer's picture of the 'Dead Bull.'"

The keeper (Barnes) thus rescued, with four broken ribs and many wounds and bruises besides, lived to the age of eighty years. The account of the Chillingham cattle closes with some notes upon the cross with the Shorthorn, by Sir Jacob Wilson, of whom the Earl of Tankerville writes in terms equally graceful and true, "I could not quote a higher authority." At the date of issue of the pamphlet, the experiment was in progress "under Mr. Booth's auspices," and consisted in the selection of cows from the wild breed and crossing them with Shorthorn bulls of the Warlaby blood. "This wild breed holds its own very strongly, and the first cross is not distinguishable from the pure breed in its colour or distinctive marks."

The calves at birth are pure white, more creamy white afterwards, ears reddish-brown. The horns of the animals as they grow are white, with black tips; hoofs and noses black; eyes fringed with long eyelashes, which give them depth and character; bodies symmetrically formed; backs straight and

level; shoulders fine, enabling them to trot like match horses with amazing rapidity. The average weights of wild cattle killed from 1862 to 1889 were: bulls, 560 lbs.; cows, 420 lbs.; and steers, 570 lbs. For capturing bull calves intended to be made steers, a trap (described by Mr. Storer) is used, and the calves so treated are immediately released.

The history of the experiment of crossing, as recorded in the pamphlet, is briefly this:—In the year 1875 a wild bull, captured in the park, was "mated with two carefully selected and highly bred Shorthorn heifers," which produced respectively a bull, named Adam, and a heifer, Eve. Adam was exhibited at the Kilburn International Show of the Royal Agricultural Society in 1879. Eve never bred. From the notes of Sir Jacob Wilson, in the Earl of Tankerville's account of the breed, we turn to an editorial note added to the Rev. John Storer's account (page 217), where the calves are described as having "inherited the conformation and colour of the wild animal—the bull in almost every degree; the ears were red-tipped, but the eyelids were black, and the nose not entirely black, but mottled. There was much loose-hanging skin from the throat to the dewlap, and he appeared to be not quite so good behind the shoulders as the wild cattle. . . . The cow-calf partook more of the Shorthorn character, and was a shapely, good calf, fuller of flesh than the bull. . . . Its ears were tipped with red, and the lower eyelid was black, the upper one being white. It differed also in having a clear nose, like the Shorthorn." The bull calf had more of the wild nature than the heifer, and when anyone entered his box would first attempt flight, then set himself in a posture of defiance. The heifer was not nearly so wild, although she would assume the defiant attitude of the bull-calf on the first impulse of alarm. Returning to Sir Jacob Wilson's notes, we learn further that, soon after the commencement of the experiment, a difficulty in bringing it to a practical issue upon the plan first tried was discovered, and the reverse practice—that is to say, the introduction of wild heifers to the shorthorn bull—was consequently

adopted. The precise nature of the difficulty of continuing the first experiment is not stated in the pamphlet, but presumably is indicated in a passage in Mr. Storer's book (pages 126, 130, 131), in which, after translating directly from Boethius ("Scotorum Historiæ"), the statement that the white wild bulls of the great Caledonian Wood, informed by their acute sense of smell, fled from herbs, trees, or fruits which, within a period of many days, had been touched by the hand of man; he observes that it is confirmed by many modern instances, and refers especially to the Chillingham cattle, and to the authority of Sir Jacob Wilson himself, from whom he had the information that when a domestic cow was introduced, for experimental purposes, to one of the Chillingham bulls, "though she was quite prepared to give him encouragement, the bull would take no notice whatever of her, and the Chillingham people ascribed this curious result to one thing only: that she had been lately handled by man, and that the wild bull could not endure that smell." An editorial note adds that, on the repetition of the experiment, in the autumn of 1876, a wild bull, captured for the purpose, at first showed a disposition to kill one or two of the Shorthorn heifers to which he was introduced, but that eventually, owing, it was supposed, to "the smell of man having passed off," his antipathy disappeared and offspring were obtained. Loss of time, however, on each occasion, suggested the expediency of reversing the experiment. "For this purpose," Sir Jacob Wilson proceeds, "three wild heifers were taken from the park and mated with a highly bred and carefully selected Shorthorn bull, Baron Bruce, from the herd of Mr. Hugh Aylmer, in Norfolk." The offspring of the cross, for several consecutive years, were all bulls. At length, in the year 1885, a heifer calf was born, and another in 1886. In the same year two bull calves were born. The heifers were named respectively Wild Rose I. and Wild Blossom I.; the bull calves, as steers, received the names of Chillingham and Chillingham II., and were both exhibited at the Smithfield Club Show.

Chillingham, calved January 1st, 1885, shown at the age of 3 years 10 months and 2 weeks, had a high commendation and the reserved number. His live weight was 16 cwt. 2 qrs. 24 lbs., and his dead carcase weight 87 st. 10 lbs. (14 lbs. to the stone), loose tallow 11 st. 4 lbs., and his remarkably thin hide weighed 6 st. 4 lbs. Chillingham II., calved March 10th, 1886, took the third prize at the age of 3 years 8 months and 1 day, and weighed (alive) 18 cwt. 2 qrs. 5 lbs.; dead carcase 96 st. Both proved most excellent beef, with an extraordinary proportion of lean in the best parts. Chillingham had been kept on grass alone until three or four months before the show.

The only other representative herd of the wild white race kept pure in a large park in England was that at Chartley, in Staffordshire, a property which, up to its sale in 1905, belonged to the Earls Ferrers, whose ancestors were in possession of the place when the wild cattle were originally driven into the park, about 650 years ago, from the neighbouring Forest of Needwood. The late Rev. John Storer, who saw the herd twice, first in July, 1874, and secondly in December, the same year, describes the cattle as large, and in style and carriage strikingly majestic, with magnificent horns adding much to their grandeur. They are, indeed, he observes, essentially Longhorns. The hind-quarters, although good and long, are nevertheless, as in all wild animals, comparatively lighter than the fore-quarters, which are remarkably deep and massive, especially in the bull, the shoulders beautifully formed, and the back and under lines straight, the body generally deep and the legs short. A noticeable feature in the bulls was the dewlap, the extraordinary amount of loose skin beneath the chin, throat, and breast, a characteristic also shown in the bull of a group of Chartley cattle amongst the illustrations of his work ("Wild White Cattle"), and in a proportionate but lesser amount in a cow of the same group. The Chartley cattle were not nearly so wild as those of Chillingham, as in summer they allowed themselves to be approached,

at first to the distance of 80 or 100 yards, and afterwards, when the first suspicion of strangers had passed off, within a very short distance; and in winter to be driven into a paddock with paled fence, from outside which they were leisurely inspected at the distance of 30 or 40 yards. They evinced only, under inspection, a little timidity, not the impatience of thoroughly wild cattle. They will not, however, allow themselves to be touched, even by the man who feeds them in winter. An orphan heifer calf, seen in the summer with an ordinary nurse cow, away from the herd, is described as "the picture of wild grace and beauty," as it stood staring at the visitors, the snowy whiteness of its abundant hair beautifully relieved by its jet-black eyes, ears and muzzle.

In May, 1905, the Chartley cattle, with the exception of a bull and cow, were sold to the Duke of Bedford and removed to Woburn Park. Colonel Congreve, who purchased Chartley Park, secured from the Duke of Bedford a bull and cow.

At Lyme Park, in Cheshire, an ancient herd of wild cattle, nearly extinct, was about twenty years ago unsuccessfully crossed with a polled white bull from Gisburne, and subsequently, with better results, a Chartley bull was introduced.

A hornless variety of the wild white race is known to have existed formerly at Whalley Abbey, in Lancashire; also later at Gisburne Park, in the Craven district of the West Riding of Yorkshire; at Middleton Hall, Lancashire; and Gunton Park, in Norfolk. At the present time, under domestication, it is represented by a distinct breed, in the counties of Norfolk and Suffolk, but hitherto in the hands of a very few owners, and by one herd in the county of Chester.

Dr. Whitaker, in his "History and Antiquities of Craven," says that Gisburne Park, at the time of his writing (1805), was chiefly remarkable for a herd of wild cattle, descendants of that indigenous race which once flourished in the great forests of Lancashire. In a foot-note he adds that much attention is due to the family tradition that they were brought from Guisborough Priory, in Cleveland, after the dissolution.

Mr. Storer rejects that tradition, regarding the alleged origin as highly improbable, on account of the distance, and apparently impossible, because Gisburne was not imparked until long after the period indicated. Both Whitaker and Bewick refer to the transfer of the cattle from Whalley Abbey to Gisburne Park, and mention the fact that they had been long kept in the Lord Abbot's Park at Whalley Abbey before they were taken to Gisburne. The neighbouring and ancient Forest of Bowland is supposed to have been the original source of the Whalley Abbey herd. As family traditions often have foundation in fact, and are liable to change as they pass down the centuries, the story of descent from Guisborough cattle may be the one element of truth in the Gisburne tradition. Grant the truth of the tradition that the Whalley Abbey cattle descended from the old Bowland Forest race—the wild race of horned cattle, doubtless—it is still quite conceivable that, before the dissolution of the Monasteries, the Abbot of Whalley wanted a dash of fresh blood — possibly he fancied a polled cross, to breed away the horns — and that, whatever his object, he had cattle from the Prior of Guisborough. If, some time after the dissolution, the remains or descendants of the Abbot's herd went to Gisburne, we have at once the family tradition explained. It is quite within the limits of possibility, and one little circumstance seems to partly favour this suggestion. It is this: We read in Bewick that the cattle were "drawn to Gisburne by the power of music," a statement which elsewhere is explained to mean that, attracted by instrumental music, they followed a band to Gisburne, where they found a home. They scarcely would be induced to leave the rich pasturage, if they could force the fences, of the Abbey lands. If they did indeed break away from their place of contentment, the Lord Abbot assuredly would not fail to have them all driven back. Any cattle so led from Whalley to Gisburne, and allowed to remain there, must have been wandering at large in a semi-wild condition,

without owner or caretaker. In connection with the reference here to Guisborough as an ancient home of the wild white cattle, the reader may be reminded of an incident related in various works on cattle, the presentation of a number of white cattle with red ears to the Queen of King John, by the lady of Lord de Breuse. That nobleman was a descendant of Robert de Brus (the name is variously spelt), the founder of Guisborough Priory in the year 1129.

For the maintenance of some of our best breeds of stock, as also for the guardianship and promotion of general field husbandry, we are undoubtedly indebted to the English monks of the middle ages. The dishorning of a breed by a cross and subsequent selection would be no difficult task to those enlightened and very practical breeders in the monastic houses. The difference between the polled and the horned white breed of the parks may be fairly stated as about equal to the difference between the West Highland breed and the Galloway polled breed of Scotland. A single poll cross would suffice to effect the change of hundreds of cattle from the horned to the polled type within a very few generations, and the interbreeding of the polled descendants would eventually ensure the constancy of the new characteristic.

In Whitaker's account of the Gisburne cattle, no notice is taken of the improbability that their progenitors were ever hornless in a wild state, unless, after deprivation of the horns, they had reverted to that state from a domesticated or semi-domesticated state, by escape from man's control into the remaining portions of any of the ancient British forests. There is, however, a reference to the characteristic polled head as constituting the distinguishing difference between them and the cattle of Lyme and Chillingham. Whitaker describes them as "white, save the tips of their noses, which are black." The Rev. Henry Berry, writing upon the Gisburne herd in the *British Farmer's Magazine* of October,

1834, quotes Whitaker's introductory assertion of its descent from the indigenous race of the great Lancashire forests, and comments upon the appearance of the cattle in that year:—

"All my ideas of wild cattle were associated with Bewick's spirited representations of those in the Earl of Tankerville's park, *wild* cattle indeed, and exhibited in wild and fitting scenery. It will hence be easily imagined I experienced something worse than disappointment when, instead of being introduced to a herd of these animals, located in a spot congenial to their supposed habits and character, I was shown into a paddock, where a two-year-old bull, the only male now in existence, and a cow, quietly exhibited themselves, with features and temper truly phlegmatic. . . . . They are totally deficient in all the *keen* features, if I may so speak, which distinguish animals in a state of nature, or those which have not peculiarly come under the effects of domestication. They have large, heavy heads and necks, large ears, and dull eyes, and a carriage and character perfectly saturnine."

Mr. Berry thought that Dr. Whitaker was "more in his element when revealing the intricate character of an ancient inscription than in recording the colour of a bull's nose," and, referring to the doctor's statement that the Gisburne noses were black, observes that every one of the herd shown to him had a nose of clear unbroken flesh colour, and he had not the least doubt that this had been the case always with the pure wild cattle at Gisburne Park. Mr. Assheton, of Downham Hall, near Clitheroe, representing the ancient family formerly owners of this breed of cattle, informed Mr. Storer that a copy of Whitaker's "History of Craven," in the library at Gisburne Park, has the following note in the handwriting of the first Lord Ribblesdale, opposite the statement that the noses were black:—"The ears and noses of this species of cattle are never black, but mostly red or brown."

Bewick, writing in 1790, describes the Gisburne cattle as "some perfectly white, except the insides of the ears, which

are brown. They are without horns, very strong-boned, but not high."

A specimen cow, pure white, including the ears, inside and outside, and hoofs, with a nose supposed to have been "white," or pale flesh-coloured originally, but in the stuffed and long dried state ashy brown, was presented to Owen's College, Manchester, between the years 1835 and 1839, and entered in the catalogue as "the white-eared variety." According to Mr. Storer, the red markings of the ears and darker shades of brown or flesh-colour of the noses had changed, under constant selection, to white. In that case the selection for pure white would narrow the limits of choice within the previously reduced herd, and quite account for the state in which Mr. Berry found the herd in 1834, when the number was about seven, and he did not think it could be kept up to that much longer, for the person in charge assured him that the cattle were rapidly deteriorating in size, and the calves at that time were reared with the greatest difficulty. From Mr. Storer's work we learn that the last of the race was killed on the 10th of November, 1859.

At Blakeley, in Lancashire, wild cattle existed many centuries ago, and from them, Mr. Storer suggests, the large park at Middleton Hall, close by, was originally stocked. Tradition asserts that a cross came from Whalley Abbey. This seems very likely to be true. Original family connection and frequent intermarriages, fully shown in Mr. Storer's book, would justify the inference of its probability, even if no tradition to that effect had existed. The fact that the Middleton Hall cattle, so far back as we have any description of their appearance, were hornless adds to the strength of the probability; for we have no evidence that the wild race which once roamed at large at Blakeley had varied from the common wild type by losing the horn. From Middleton Hall, in 1765, a part, if not the whole, of the herd was taken to Gunton Park, in Norfolk, after the death of Sir Ralph Assheton, of Middleton, the elder of whose two daughters (co-heiresses) had

married Sir Harbord Harbord, afterwards the first Lord Suffield. At Gunton Park the herd, domesticated and used for dairy purposes, was in its best state during the lifetime of the third Lord Suffield, who died in 1835; but it declined and became extinct, apparently, in the time of the fourth lord, 1835-1853 ("Wild White Cattle," p. 300); yet, whilst the herd ceased to exist at Gunton, its offshoots flourish in the county of Norfolk to the present time. A branch was established at Blickling about the close of the last century, through the marriage of the heiress of the estate, one of the daughters of the second Earl of Buckinghamshire, with the Hon. William Assheton Harbord, afterwards second Lord Suffield. Another branch, belonging to the Cator family, at Woodbastwick Hall, near Norwich, had its beginning in a cow bought at a sale of some of the Gunton cattle, about 1840, in calf to one of the Gunton bulls. The offspring, a bull, was kept, and became the sire of her second calf at Woodbastwick, a heifer. From this nucleus the herd sprang. Occasional exchanges of calves between Blickling and Woodbastwick gave mutual renovation of blood, if that may be properly called new which is altered by separation for a few generations and difference of pasture; but about the year 1864 a Shorthorn bull ("Wild White Cattle," p. 314), was used for two years at Woodbastwick, and another after an interval of nine or ten years, in which interval polled bulls bred in the herd were employed. The old Gunton type, however, was very strong, and here, as elsewhere, seems to have asserted itself in a mostly successful struggle against the crosses introduced, although not always to exclusion of the evidences of strange blood. The original Gunton cattle were large, wide in the haunch, back and loin, white with black ears (some had dark brown ears), noses and hoofs also black, and black rims round the eyes. They were excellent milkers, with large and well-formed udders.

A herd of polled white cattle, domesticated, but possessing, with an exception in the loss of horns, the distinctive characteristics of the wild race, has existed at Somerford Park, the

seat of Sir Charles Watkin Shakerley, Bart., near Congleton, Cheshire, tradition says, for more than two hundred years. The Rev. John Storer, quoting the tradition on Sir Charles' authority, added his own opinion that it much understated the age of the herd, the origin of which, and date of origin, are unknown; and he maintained that the herd, "certainly of great antiquity," was probably, since the Gisburne cattle became extinct, and the Hamilton herd in Scotland acquired horns, the best remaining representative "of the hornless and tame variety of the originally wild white breed."

Within the last few years a bull from Somerford Park was used in two of the East Anglian white polled herds of the Gunton Park breed. The results were not those of a cross between two distinct breeds, but were only such as were likely to follow an influx of renovating blood from a separate herd of the same breed. There is another herd of wild white cattle, with black points, at Vaynol Park, near Bangor. The herd was founded on purchases from Kilmory.

In Scotland the Hamilton herd, in Cadzow Park, Lanarkshire, and the Kilmory herd, in Argyllshire, were the only herds of wild cattle remaining at the time of Mr. Storer's exhaustive inquiries. They are scarcely, however, to be classed together. The former, occupying an ancient royal chase on the confines of the great Caledonian Forest, is of unknown antiquity, and is said to have been at one time hornless—a characteristic retained in some of the cattle, particularly cows, down to a recent period; but when Mr. Chandos-Pole-Gell saw the herd in the autumn of 1874, then numbering about thirty animals, including one bull, all had horns, and remarkably beautiful heads. The body colour of the Cadzow cattle is described as dun-white, sometimes inclining more to dun, with black hair inside the ears, black muzzles and hoofs, and black spots down the fore part of the leg below the knee; the tongue and inside of the mouth black or spotted.

The Kilmory cattle, of a composite breed, formed within

the last seventy years, represented the remains of wild herds now extinct, formerly kept by the Dukes of Athole at Blair Athole, the Duke of Buccleuch at Dalkeith, and the Marquis of Breadalbane at Taymouth, crossed with the West Highland breed. Sir John Orde, to whose skill and experience as a breeder Mr. Storer paid a high tribute, procured the last surviving bull of the Athole race, selected white Highland cows, crossed the offspring with a bull of the wild race from Lord Breadalbane's herd shortly before it became extinct, and subsequently selected a white West Highland (Argyllshire) bull calf with black points to follow the two wild bulls. The cattle thus bred were described as resembling both the original Athole race and the ordinary West Highland breed, in colour white, with black muzzles, and black hair inside the ears. They still retained to some extent the wild character, the calves of five or six months old frequently attacking the herd-boys, and the cows much given to quarrelling among themselves. This herd was carried on for nearly fifty years.

(3) Changes under Domestication.

In nature we see everywhere the law of fixity of type: wild beasts, birds, insects—all forms of animal life—constantly true to type throughout countless generations; and the same law is found in vegetable life. This law, indeed, is concurrent with another law, by which, under changed conditions of nature, corresponding changes are generally wrought in animals brought under those conditions. We may call it the law of adaptation. By that law, the survivors of species migrating to places where new natural influences introduce necessity for modification of the animal, become so far altered in character and type as to accommodate themselves to their new homes, and to live, flourish and perpetuate their species in new conditions of life.

There, again, the law of fixity asserts itself. But as soon as the hand of man is seen, as soon as man subjugates and appropriates to his own use the wild races of animals, natural

conditions being then exchanged for artificial conditions of life the law of variation is manifested. Some of the changes which animals undergo in man's service are obviously necessary consequences of their altered circumstances; other changes are not so clearly the results of necessity. The connection of cause and effect is sometimes not easy to find. The fact of variation in domesticated animals, however, is there; the sizes, forms, colours, habits and tempers of those animals are subject to such changes as were unknown in the wild state; their constitutions, as generations pass on, become altered under varying conditions; and their capabilities are gradually enlarged in the direction of man's requirements.

The animals in their wild state are endowed with the instincts, the powers, and the constitutional stamina necessary to the maintenance of existence in that state. Provision for their own preservation is seen in all the natural characteristics of each race. As regards man, they are his raw material, ready to supply his wants; and if some of the species (such as the carnivora) are generally unsuited to his use, they are doing their part in the economy of nature by serving to adjust the balance of life. When man, exercising the right of dominion granted to him, takes a wild animal race into his keeping, that race, in some measure deprived of the endowments which were necessities of its natural state, becomes fitted for the artificial state in which he is bound to keep it; and not only so, but it becomes in his hands pliable, capable of receiving the impress of his will, and in some measure prepared for conformity to the ideals of his mind. The extent of man's power to rule the forms, the colours, the wills, and the bodily functions of domesticated animals seems almost immeasurable.

An early result of domestication is variation from the wild type; and as domestication extends from district to district, from country to country, new conditions of climate, soil, pasturage and shelter, and various systems of breeding and management, conspire to widen the divergence of branch

from branch of the one race. In the first instance, we may suppose the calves of wild cattle, found soon after birth, were taken home and reared, kept in some sort of rough enclosure, and in course of time made useful in one way or another. Draught, perhaps, was one of the principal early uses. Then, as the cows bred, their milk, or a portion of it, would be used sometimes as food by the owner and his household; and the value of veal and beef having been discovered previously from the proceeds of the chase or the pitfall trap, the flesh of the home-bred cattle would come into consumption. So, no doubt, our dairy and grazing systems had their beginning; and local influences, selection, and the blending of new characteristics acquired by the domesticated race would give a considerable variety of breeds.

Variation, presumably, would be greatly increased, and varieties multiplied, by cross-breeding among those descendants which differed most widely from the parent stock and from one another; still more greatly when descendants of two or more wild stocks (different species) were crossed together. But mere presumption, indeed, may be put aside in favour of fact, when we compare the present variations of large domesticated animals, when variously cross-bred, with those of the smaller and much more rapidly reproducing quadrupeds and birds under systematic experiment in cross-breeding, in some cases beginning with the wild stock.

An objection to the argument here considered may be raised upon the ground that the offspring of the cross of two distinct species—if the two distinct species, when crossed, produced any offspring—would be hybrids, and that hybrids are very commonly unfruitful. Such an objection is met with the indisputable fact the American bison has bred freely with the taurine ox, and that the offspring of those two distinct species have proved highly fertile, both among themselves and with each of the pure parent species. There is also the existing evidence, on the testimony of high authori-

ties, that domestic dogs, and some other domesticated animals, represent breeds each derived from more than one wild stock. The wild stocks themselves might refuse to mingle, and so might their respective offspring whilst but newly under the control of man; or if offspring were produced from the crossing of the two, the offspring very probably might prove to be either partly or wholly sterile; yet according to the theory of Pallas, regarded with favour by Darwin and other prominent naturalists, the long-domesticated descendants of those wild stocks may breed freely together. A long course of domestication, if Pallas and those who adopt his doctrine be right, removes the bar of sterility originally keeping separate all distinct wild species. Darwin himself, writing upon British cattle, refers to differences partly attributed to descent from primordially distinct species, but much to variation even as early as the neolithic age, when domesticated cattle existed in Britain. (Darwin, "Var. of An. and Pl."; Pallas, "Acta Acad." [St. Petersburg, 1780]; J. A. Allen, "Memoir of the Mus. of Comp. Zoology, Harvard College, U.S.A." [Washington, 1876], art. "The American Bison").

Suppose, then, that in Britain, prior to the Roman occupation, several well-defined varieties of domesticated cattle existed, all belonging to the small short-horned race (the Celtic ox), and that the Romans, Saxons, or any other invaders, brought into these islands domesticated cattle of various types and greater size, descendants of the gigantic *urus* of Central Asia, through his progeny distributed over the European Continent, Britain would then contain all the elements necessary to the compositio of new breeds in infinite variety.

But new and fixed breeds do not suddenly appear out of the fortuitous mixing of various types. Mongrelism and inconstancy are the immediate results of frequent and unregulated crossing. Either local conditions affecting the character of the animals may effectually reduce the mixed cattle of a whole district to one distinct breed by causing one type to increase and

prevail, other types gradually disappearing; or else man, with a definite ideal and a design which he steadily works out by selection, may compose quite a new type out of the heterogeneous materials he finds around him. From the scraps of evidence which, gathered from many sources, form the material of histories of breeds, we infer that some of our breeds now distinct owe their origin to the concurrence of local conditions and human design. The owners of cattle, having formed their ideal from the specimens found to do best in the district, therefore retained the animals most nearly approaching to that ideal, and those which in the course of practice were proved to be especially suited to the local conditions. Some breeders who thus acted upon a design and purpose, more or less clearly shaped, became distinguished as leaders of improvement. Either their powers, their opportunities, or powers and opportunities together, were superior to those of their neighbours and fellow-workers, and brought them to the front. Other breeders may have been as wise as they, not less judicious than they in their selections of animals and general management of the breeding herd, and not less successful in the results, fame only excepted. A vast proportion of the progress in the development and improvement of breeds, as in other affairs, is effected by obscure workers, and the fruit of labour remains when most of the labourers are forgotten. In the histories of breeds, if tracing to the many sources of each were possible, we should doubtless often renew acquaintance with the poor wise man whom no man remembered.

The footprints that first marked the path of improvement are worn away by the march of the multitude. A few men of power, indeed, have left lasting traces along the road; those men, such as Bakewell, the Brothers Colling, Benjamin Tomkins, Francis Quartly, and Hugh Watson, being followers of the men who made tracks across the untrodden waste, and who are either quite forgotten or but dimly remembered, the forgotten forming a large majority. We may say, in-

deed, that the race of live stock breeders appears to be indigenous to Britain. The British mastiff bears witness to the antiquity of the passion for domesticated animals and of British skill in breeding them, whilst a race of small domesticated Shorthorn cattle is known to have existed in England prior to the Roman occupation. The Saxon population of the country made much of their working oxen and appear to have possessed a breed of dairy sheep, from whose milk cheeses were made; and breeds of both light and heavy horses, and of deep-milking cows were carefully cultivated in the period immediately following the Norman conquest.* In the records of the Middle Ages we have no wealth of evidence of the prosperity of live stock interests, but some indications that love of live stock had not died out. Civil wars and other hindrances no doubt checked progress for several centuries. About the middle of the eighteenth century the great renewal of attention to the improvement of all live stock began. It was preceded, certainly, by signs of awakening interest; and whilst the revival extended to all kinds of domesticated animals, much skill was specially concentrated upon the improvement of the bovine varieties. Herds of cattle were quickly bred up to great excellence, and, being passed on, often, from father to son, or from uncle to nephew, or other next of kin, were under the continuous attention of the same family for several generations, guarded from deterioration by family pride in the reputed possession of some of the best stock in the neighbourhood, wherever that might happen to be. A new era had opened—the era of studied improvement, of systematic experiment, and of the larger application of science to the special subject of stock-breeding, as to general agricultural practice. The latent

* See translations of Fitz-Stephen's Latin description of London and the neighbourhood in Stow's "Survey of London," two editions, latest edited by Mr. Thomas, Secretary of the Camden Society. Fitz-Stephen, a Monk of Canterbury (biographer of Thomas à Becket), died 1191. See also Turner's "Hist. Anglo-Saxons."

taste of the people was extensively called into activity, with the result that the last 150 years have seen the development of those breeds which won for British live stock a world-wide reputation.

A new order of classification is observed in the notices of the principal British breeds of cattle in this volume. The breeds are arranged in four groups, each group occupying a chapter, each breed a section of a chapter. The order is:—(1) ancient horned breeds; (2) improved horned breeds; (3) polled breeds; and (4) Channel Islands breeds. In the first group (Chapter II.) we have breeds representing very ancient types, without historical improvement other than was effected at any time by special attention to useful properties in stock selected for breeding. The group includes breeds which, for anything we know to the contrary, may have been as good many centuries ago as they are now, and of the same type in times long past as at the present day, with modifications, in some cases, to suit modern requirements, or effected by modern practice. In this group we have the Scotch Highland, Welsh, Kerry, Devon, and Sussex breeds. The Dexter grouped with the true Kerry and the South Hams with the Devon may seem, as composite breeds, somewhat out of place among the ancient horned breeds; but in both cases the relationship seemed too close for dissociation.

Following the ancient horned breeds are those breeds of which we have historical records of improvement, or of origin. They are (Chapter III.) the Hereford, Longhorn, Shorthorn, and Ayrshire. The reasons for this order, briefly stated, are that the Hereford is closely allied to the Devon and Sussex breeds, but has been improved, for various purposes and districts, by the introduction of a foreign cross. The Longhorn, believed to have been unknown in Britain earlier than the middle ages of English history, and probably until within the last two or three centuries, is regarded as an imported breed, or the offspring of a foreign cross. It was

the very first breed improved under the new or Bakewellian system, the modification being effected not by crossing, but by selection and inbreeding. The Shorthorn and Ayrshire are considered as composite breeds, a term which is not derogatory to their merits, but merely suggestive of their origin in the blending of various breeds for the combination of properties valued in those breeds. Fixity of type and potency of transmission once secured and carefully maintained, the breed is virtually a pure breed. Indeed, if the question of absolute purity be raised, one would feel very doubtful whether any existing British breed or individual could bear examination of its ancestry; if, indeed, the probability that it could *not* stand that test did not at least verge upon certainty. Reference to known crosses admitted into almost every breed in the United Kingdom, and to times and events which made the guarded separation of breeds impossible, will surely convince the candid student of this subject that any claim of absolute purity is absolute nonsense. Types, however, not totally destroyed by crosses re-assert themselves. Distinct and ancient types do so with power, and although for a time reversion to a cross may occur, there are times and conditions in which, as Professor Darwin has shown, reversion fails, so that virtual purity may be restored, and the further contention here is that virtual purity—that is, breeding true to type—may be obtained in a composite breed. The degree of security from reversion to undesired characteristics, which in an artificial (a composite) breed is believed to be possible, will probably suffice for all useful purposes.

The third group (Chapter IV.) is that of polled breeds—the white, or hornless park breed, the Galloway and Aberdeen-Angus breeds of Scotland, and the red polled or East Anglian breed. The white is placed first as presumably closest in relationship to the horned white breed of English parks, notably represented in the Chillingham and Chartley herds; the Galloway second, on account of its relationship to the Highland breed; and the Aberdeen-Angus and English

red polled breeds follow as breeds developed and improved by modern attention and skill.

The breeds of the Channel Islands (Chapter V.) are undoubtedly of French extraction, and are believed to represent the *longifrons* type in different degrees, the Jersey breed to be the nearer to that type. They alone occupy the fourth or last section of this arrangement of the distinct breeds of cattle of the British Islands.

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CHAPTER II.

ANCIENT HORNED BREEDS.

(1) SCOTCH HIGHLAND.—Native Districts—Reputed Source—Descriptions—Culley—McNeill—Colours—Hebridean Herds—Decline and Revival—Mainland Breeders—The Breed at English Shows—Herd Book—Breed Society—Exportation.

(2) WELSH.—Pembroke and Anglesey Breeds—Ancient White Race—Smaller Dark Mountain Cattle—Descriptions by Different Authorities—Herd Books—Col. Platt's "Notes"—Dairy Properties—Weights—Glamorgan and Montgomery Breeds—N.A.S.E. Shows—Mr. Morgan Evans' Testimony.

(3) KERRY AND DEXTER.—Supposed Antiquity of the True Kerry—Dexter Variety—Messrs. R. O. Pringle and J. C. Morton on the Kerry—Irish and English Breeders and Exhibitors—Various Authorities Quoted—Royal Patronage—Extension in England—Deep Milkers—Grazing Bullocks—"Irish Farmer's Gazette Register"—Royal Dublin Society's Herd Book—English Breed Society—Value for Crossing.

(4) DEVON AND SOUTH HAMS.—Supposed Ancient Origin—Lord Somerville—Area Covered by the Breed 100 Years Ago—Larger and Smaller Varieties—Standard of Form and Colour—Sinclair's History—War Prices—Sacrifice of Best Devons—Francis Quartly—The Quartly Family—The Davy Family—Col. Davy and the Herd Book—Devon Cattle Breeders' Society—The Flitton Herd—Other Early Herds—Holkham—Kinlet—Copt Hall—Dorset Dairies—Quality and Weight—South Devons, now a Distinct Breed with a Herd Book—Their Character and Dairy Properties—Association of Breeders.

(5) SUSSEX.—An old Working Breed with Strong General Resemblance to the Devon, and Supposed to be Descended from the Same Original Stock, latterly Improved as a Beef Breed—Arthur Young's Account—George Culley's Quotation of Mr. Ellman—Lord Suffield quoted by Youatt—Weights of Team Oxen—

Smithfield Steers—Early Records of R.A.S.E. Winners—Recognition by the Society—Herd Book Society—South of England Shows.

(1) Scotch Highland.

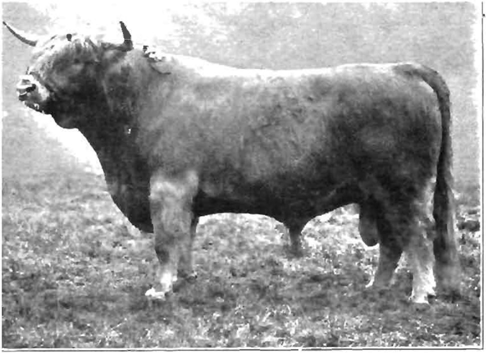
Our heading is intended to cover, in whatever locality now found, the ancient middle-horned breed of cattle in Scotland, generally regarded as the breed of the Western Highlands, common both to the Mainland and the Hebrides. Although capable of growth to considerable weight, when removed to rich lowland pastures, or to the feeding-stall, this breed is usually classed with the descendants of the small Celtic ox.

George Culley, writing late in the last century, has described the breed under the head of "The Kyloes." He considered that "the Galloway breed, or polled cattle," seemed to be, in weight and size, as much less than the longhorns as the longhorns were less than the shorthorns, and the kyloes were still less in proportion to the polled cattle, than the polled cattle to the longhorns. Of the kyloes he wrote:—

"This breed is also covered with a long close coat of hair, like the polls and longhorns; and, like these, their beef is fine grained, well-flavoured, and mixed or marbled, but not so handsome on the outside of the beef when killed, being not of so bright a colour, and often spotted with black, even upon the best parts, except when made very fat. When grazed they feed very readily, their weight in general being from 20 to 35 st. Some particular ones reach to more than 40 st."

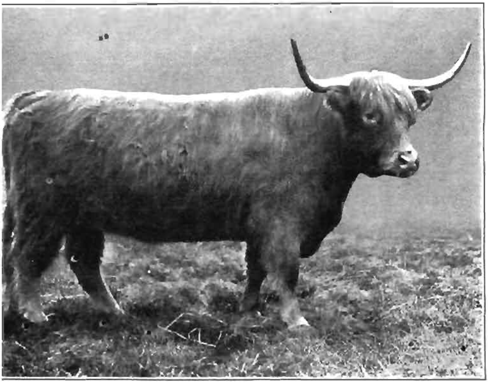
The stone is that of 14 lb. A kyloe bred in Cantyre, and therefore presumably of the true West Highland breed, is mentioned by Culley as an extraordinary specimen, weighing —two fore-quarters, 43 st. 12 lb.; two hind-quarters, 37 st. 8½ lb.; giving 81 st. 6½ lb. as the weight of the carcase; tallow 13 st., and hide 6 st. 4 lb.; total, 100 st. 10½ lb.

Mr. Malcolm McNeill, of Islay, contributes to Youatts work the following description of "the true kyloe or West Highland bull":—



to by C. Reid.

HIGHLAND BULL.



HIGHLAND COW.

"The Highland bull should be black, the head not large, the ears thin, the muzzle fine and rather turned up. He should be broad in the face, the eyes prominent, and the countenance calm and placid. The horns should taper finely to a point; and, neither drooping too much nor rising too high, should be of a waxy colour and widely set on at the root. The neck should be fine, particularly where it joins the head, and rising with a gentle curve from the shoulder. The breast wide and projecting well before the legs. The shoulders broad at the top and the chin so full as to leave but little hollow behind them; the girth behind the shoulder deep; the back straight, wide and flat; the ribs broad; the space between them and the hips small; the belly not sinking low in the middle; yet, in the whole, not forming the round and barrel-like carcase which some have described. The thigh tapering to the hock-joint; the bones larger in proportion to the size than in the breeds of the southern districts. The tail set on a level with the back. The legs short and straight. The whole carcase covered with a thick, long coat of hair, and plenty of hair also about the face and horns, and that hair not curly."

Black, evidently the favourite colour of this particular authority, is here mentioned as if it were the only admissible colour. It has become, no doubt, from fancy and fashion, by means of selection, the prevailing colour, but it is not the only colour of the pure Highland cattle; red, yellow-red, yellow, dun, brindled, silver-dun, and a silvery sort of white, are all proper colours of the true breed, whatever may be the fancy of the day. Indeed, to Southern eyes, the variety of yellow, yellow-red, dun and silver-dun is infinitely more pleasing than unmitigated black, which alone is scarcely suited to English park landscape; while for the utilitarian object of beef-making the livelier colours are not one whit behind the most sombre as tokens of excellence in the animal. If any difference exists it is rather supposed to be in favour of yellow or yellowish hues, which some English purchasers

regard as indications of special readiness to fatten on rich grass land.

The colour of the muzzle, or bare part of the nose, and of the horn, varies with the colour of the hair. This fact Mr. McNeill, in his communication to Youatt, seems to have overlooked. The red or yellow-red cattle have mostly clear buff or light-coloured muzzles, and horns clear of black, whilst the black have the same colour on the hairless skin of the nose and horns at least black-tipped, if not so coloured to a greater extent. The fineness of the throat mentioned by Mr. McNeill was perhaps a fancy at its height at the date of his writing to Youatt, but it certainly was not a *sine quâ non* of Hebridean connoisseurs a quarter of a century ago. Some breeders then professed to like a clean throat, but none seemed to think the worse of a good bull for a little loose "leather" just below the root of his tongue. They declared that it had been within their memory no unusual thing for a breeder to cut off what he considered superabundant skin, sew up the wound, and, when healing was complete, enhance the selling value of the animal by boasting of the beautiful arching curve of the throat-line.

About thirty years have passed since the beginning of a change which, about the year 1870, extended considerably in some of the Western Islands. In consequence of the enlargement of farms by the absorption of smaller holdings, the building of winter housing for cattle proportionate to the increased acreage of the farm, and the improvement of steamboat communication between the islands and the mainland, Lowland dairy farmers, or young farmers who had learned the management of dairy herds on the mainland, took farms in the Hebrides, and, substituting Ayrshire for Highland cattle, and cheese-making for the old Hebridean practice of stock-raising for the Scotch mainland and southern markets, established a business which seemed to threaten the existence of the old hardy breed. A considerable number of the native farmers went with the rising tide, and the result was a rapid

decline of Highland herds for ten years or thereabout, when reaction became evident, and many, either of those who had taken up the new system or of their successors as farms became vacant, returned to the old practice. A gradual but sure improvement thus began, and even within two or three years the revival of the Highland breed in Islay was recognised as a hopeful angury of its restoration elsewhere. From the dispersed herds of Messrs. McNeill of Lossit, Campbell of Cladville, Macdonald of Ardneave, Webster of Daill, and other noted breeders in that island, with a few importations from neighbouring islands, and from the mainland of Argyleshire, excellent herds were formed, and the beneficial results of mixing strains of blood from different districts were manifest in the newly-established herds of Islay.

The old Colonsay herd had been sold off five or six years before. In Mull, when the reaction began, although the principal herd had been dispersed, good herds remained. The Laird of Jura's herd, once famous in the show-yard, still existed. It was not finally dispersed until August, 1890, when the late Duke of Hamilton was the largest purchaser for the Arran herd. Several choice animals were bought for Lady Gordon Cathcart; some for the Earl of Southesk; Sir John Campbell Orde, also a buyer at Ardneave, Lossit, Daill and Cladville, secured a few for his mainland herd in Argyleshire, and Mr. Malcolm added some good animals to his herd at Poltalloch in Argyleshire, a noted herd as far back as the early years of the present century. The Poltalloch herd contributed winners to the Battersea International Show of the Royal Agricultural Society of England in 1862. The Taymouth Castle herd, said to have been the best Highland herd of its time in existence, was there strongly represented by winners. That herd, dispersed on the death of its noble owner, contributed valuable material to the composition of many and widely distant herds. Thus much immediate and some lasting good was done; but it is at least questionable whether its scattered fragments did as much good as the herd, if retained in its established excellence,

might have done. When it was gone one grand source of concentrated power had ceased to exist. The present Marquis of Breadalbane founded the new and choice herd at Taymouth Castle some years afterwards.

Whilst it is impossible, in the short space here available, to give anything like a fair selection from the roll of names of distinguished breeders whose herds have supplied the winners at the yearly shows of the Highland and Agricultural Society of Scotland, two of those breeders whose cattle have come over the Border on two occasions since the Battersea Show should be mentioned. In 1879 the Royal Agricultural Society again had an international show, held at Kilburn. That year, immediately before the partial revival of the Highland breeding interest already noticed, was about the time when the prospect of the breed was gloomiest. More than a bare representation of the Highland cattle was scarcely to be expected. The entries were very few, but an enterprising mainland breeder who had established a good herd, Mr. James Duncan, of Benmore, took the only prizes awarded—first without competition, with his aged black bull, Roderick Dhu, bred by Mr. Stewart, Bochastle, Callander, Perth; and first and second, with his yearling bulls, Alister Mohr and Lord Colin, respectively light dun and yellow, both bred by himself. The next and last special occasion was the Jubilee Show of the Society in Windsor Great Park, in 1889, when the Duke of Sutherland, the breeder and exhibitor of five splendid animals, all red, won the first and third prizes for bulls of any age, with Lord of the Isles and Clebrig, and the first prize and the Queen's gold medal for the best Highland animal, male or female, with a cow of rare excellence and beauty, Tarrghea, of Sutherland, and high commendations with Marchioness and Nora, Marchioness also having the reserved number. Between the Duke of Sutherland's two prize bulls, Mr. H. C. Stephens' dun, from the celebrated herd of the Duke of Athole, at Blair Athole, took the second prize, and a red, belonging to the same exhibitor, but bred by Mr. Mackintosh, of South

Kinrara,* had the reserved place of honour, and the same exhibitor's yellow cow, bred by Mr. Hector Campbell, of Ardfenaig, a commendation. The only black winner in the Highland classes was the second prize cow, bred at Bochastle, but shown by Mr. T. V. Smith, of Ardtornish, whose red cow from Benmore won the third prize. Of the eighteen entries in the two Highland classes, nine were red, five yellow, one dun, and only three of the prescribed black colour.

In the year 1884, the first volume of the Highland Herd Book was brought out. For the establishment of that work, and of the Highland cattle on the safer footing of a registered breed, the admirers of that breed, probably one of the oldest and purest, if not quite alone as the very oldest and purest, in the British Islands, were indebted to the Earl of Dunmore. It is issued by the Highland Cattle Society, at Inverness, and now numbers seventeen volumes.

For some years past exportations to the United States of America, Canada, Australia, and other colonial and foreign countries, have proved the growth of the favour in which the Highland breed is held. In America it is said to have proved exceedingly useful as a cross for what are termed "over-graded" breeds, when poorish native cattle have been taken as the foundation stock for crosses of heavy breeds, and the progeny have begun to show coarseness. The healthy, hardy nature of the West Highland or Scotch Highland cattle, and the prolonged fecundity of the cows, not seldom extended to something near a score of years, give the breed a powerful recommendation for countries in which thoroughly sound constitution and long-maintained vital and reproductive powers are absolutely necessary to the maintenance of competition for place on the ranche.

A diminutive breed of rough-coated, hardy cattle, presumably from the same original race as the West Highland breed, is found in the northern islands of Scotland. The Shetland cattle, reduced in size, no doubt, by the scanty subsistence afforded among the rocks and marshes of their

native islands, may be regarded as the more distinct variety of the race; whilst for a considerable length of time the Orkney variety has received occasional crosses from the mainland. These small animals, not framed according to southern notions of symmetry, are nevertheless very serviceable. Taken to good Scotch pastures, they fatten rapidly and make excellent beef. We have seen them in the English Midlands, whither they had been brought by special order for one proprietor of an estate. At the show of the Highland and Agricultural Society of Scotland in 1913 two classes were given for Shetland cows and heifers.

(2) Welsh.

Professor Low has considered the Pembroke breed as representing "the type of the whole mountain breeds of Wales," and has laboured to show that "the white forest breed, by the mere change of colour, becomes similar to the modern Pembrokes, and is, indeed, identical with them; the latter possess the distinctive horns of the wild breed and the yellow unctuous skin which characterises it." ("Domesticated Cattle of the British Islands"). The Rev. John Storer ("Wild White Cattle") has quoted the opinion of Rütimeyer and other great osteologists that the Pembroke cattle are descendants of *Bos. primigenius*, whilst "the other Welsh cattle" represent *B. longifrons;* but here he evidently did not intend to include the Anglesey breed, which he has expressly coupled with that of Pembrokeshire as a branch of the ancient domesticated race of white cattle with red ears, known to have existed in Wales in the tenth and twelfth centuries.

Together with early records of the existence of the red-eared white breed, we have references to the black or dark-coloured race of cattle as individually of one-third less value than the white. As the white cattle in Wales were then sufficiently numerous to be sent in considerable herds as complimentary or propitiatory gifts, and in pay-

ment of fines or forfeitures, we cannot well maintain that scarcity or fancy ruled the value. Far more probable seems the supposition that the difference was chiefly or wholly on account of the superior size of the white cattle, and that they were descendants of a larger race than the dark or black cattle of the Welsh mountain districts, which we may well suppose were little, if in any degree, altered from the type of the aboriginal Celtic ox. Although it is not impossible that in the course of centuries a black breed might be evolved from a white breed with red ears, even without a cross, yet the chances are greatly in favour of the assumption that the two varieties were frequently crossed with one another, and that eventually a breed of the size and type of the white cattle, and of the black colour, was by selection established.

The Pembrokeshire and Anglesey breeds had separate Herd Books. The first Herd Book, indeed, was originally entitled "The Welsh Black Cattle Herd Book." It was edited by Mr. James Bevan Bowen, of Llangwair, and published in 1874. An introductory article was written by Mr. Richard Hart Harvey, of Slade Hall, Haverfordwest, through whose influence and exertions, chiefly, the work was established. Both cows and bulls have reference numbers, and prize notes are given under the pedigrees of winners. In consequence of Mr. Bowen's election as member for the county of Pembroke, the second volume, issued in 1878, was compiled and edited by Mr. Harvey. The third volume, also by Mr. Harvey, was published in April, 1883. In the autumn of 1884, on the death of Mr. Harvey, the South Wales breeders took concerted action for the maintenance of the breed and Herd Book, and towards the close of the year the South Wales Black Cattle Society was founded, under the presidency of the Earl of Cawdor. Mr. James Thomas, of Haverfordwest, was subsequently appointed honorary secretary, and upon him devolved the work of compiling and arranging the Herd Book. The fourth volume, the first and hitherto the only one brought out by the Society, appeared

in 1888, with illustrations (the gift of the President), and bearing the new title of "The South Wales Black Cattle Herd Book," containing pedigrees of animals of the Castlemartin and Dewsland breeds.

In the year 1883 the North Wales Black Cattle Society brought out the first volume of their Herd Book, which was edited by the late Mr. William Dew, on whose death the editorship passed to Mr. W. Arthur Dew, of Wellfield, Bangor, who also is the honorary secretary of the Society. An editorial committee, composed of prominent members of the Society and breeders, assumes responsibility for the compilation and arrangement of the volumes, and leading breeders of the black cattle successively occupy the presidential and vice-presidential chairs. The objects of the Society, as defined in its bye-laws, are (*a*) to maintain unimpaired the purity of the breed of cattle known as Welsh, and to promote the breeding of such; and (*b*) to collect, verify, preserve, and publish in a herd book, the pedigrees of the said cattle, and other useful information relating to them." The North and South Wales Herd Books have since been amalgamated and the Welsh Black Cattle Society was established.

The following description of the southern variety, and incidentally of the principal and distinguishing differences between that and the northern variety, is given in Mr. Harvey's introductory article in the South Wales Herd Book:—

"The black cattle, to which this Herd Book especially refers, are natives of the counties of Pembroke, Carmarthen and Cardigan, and are more generally known as Pembrokeshire Blacks, sub-divided into Castlemartin and Dewsland breeds. From Cardigan they also extend along the North Wales coast up to Anglesey, and are then called the North Wales or Anglesey breed. . . . In Glamorganshire they are found in the Seigniory of Gower." . . .

"The black cattle may be described as a horned breed, generally of black colour, and frequently with white marks on

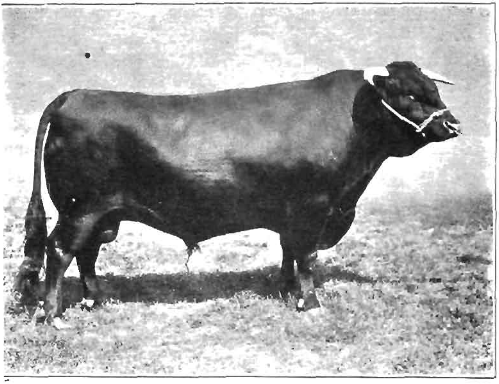


Photo by F. Babbage.

WELSH BULL.

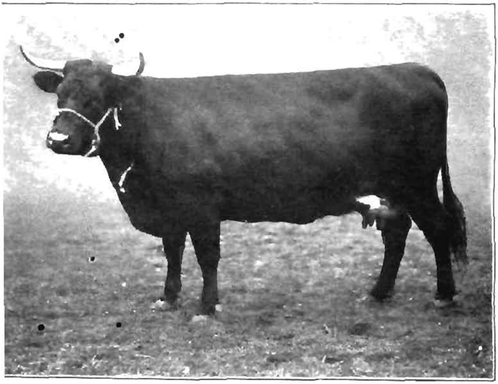


Photo by F. Babbage.

WELSH COW.

the udders of the cows, also a few white hairs at the end of the tail. Sometimes a few white hairs are mixed up with the coat, but this is not always hereditary, and only comes out occasionally. A brown-black, approaching chocolate, is considered a good colour. Occasionally there are some cows striped red and black, also some quite white, with black ears, muzzle, and feet, but these are becoming very rare. The late Lord Dynevor had some very fine specimens of the white breed, near Llandilo, and I have often admired the five-year-old oxen as I passed the park. The horns should be of a rich yellow; they are generally tipped with black and do not come out yellow to the very end like the Herefords. There is a different pitch of horn for bulls and cows. A bull's horn should be low and well-spread, the cow's narrower and the pitch more upright. The steers and oxen take more after the bulls. This description applies in a great measure to the Anglesey cattle. They are, however, broader on the back and shorter in the leg, with more hair. The heads are heavier and horns not so yellow as the Pembrokshire. A really good animal of the black breed should approach very closely in shape to the modern fashionable breeds, and by careful and judicious crossing this has sometimes been attained."

Mr. Harvey certainly did not mean by the term "crossing" here used the introduction of the blood of another breed. He simply, according to a common custom, employed it to convey the idea of carefully assorted unions within one and the same breed. Later, in the same article, he thus referred to the crossing of breeds:—

"To those who wish to be possessed of a good herd of blacks, I would say, avoid all attempts at crossing, such attempts have never yet succeeded; but purchase the best bull of a good strain, or, as we shall for the future call it, pedigree bull, that you can get for the money."

A description of the Anglesey cattle in the first volume of the Herd Book of the North Wales breeding and registration

society was written by Mr. William Evans, of Tyfey, Menai Bridge, Anglesey, and dated January 6th, 1883. It is substantially that the Cow should be *as black as possible;* short legged; with a broad, level back, a thick neck for constitution; ribs well sprung, "like an umbrella when fully opened"; tail, thin at the top, fitting closely in at the setting; thighs, well filled and low down to the hocks; the bosom projecting; wide between the fore-legs. The BULL: coal black; short legs, square set; back, broad and straight; broad across the shoulders; neck, strong and masculine; tail, thin, and, like the cow's, lying closely in at the top; "small round bones"; deep, well filled thighs to the hocks; ribs well sprung; the shoulder-points *must not* project; the bosom low and projecting; fore-legs wide apart; head, short, forehead broad across the eyes; good thick hair, soft to the touch. Mr. Evans says: "Do not use a bull with curly hair," and the counsel coupled with this is to avoid also one with bristly hair.

A pamphlet, entitled "Notes on Black Cattle" (which notes were originally written at the request of Mr. P. P. Quinn, of Newark, New Jersey, U.S.A., for publication in America) was printed at Bangor, in 1885, and is addressed to the landowners and farmers of Wales by Colonel Platt, of Gorddinog. I am indebted to the author's courtesy for a copy of the pamphlet. The description (page 9) of a Welsh Runt as he should be, is to the following effect:—Legs, short; bone, straight and fine; horns, yellowish, with black points, *turning upwards;* back, broad and level; head, forehead broad, with large, expressive, black eyes and wide nostrils; neck, strong and muscular; dewlap, large, wide and projecting (does this description of the dewlap mean or comprise the *brisket?*); chest, expansive; shoulders, broad, joints (shoulder *points?*) not projecting; ribs, well sprung; loin, broad and strong; haunches, not too wide; small, round bones; tail, long, neatly set on; hair, thick and wavy; touch, mellow. The udders of the cows and the appendages of the bulls should be white.

Colonel Platt observes that of the Welsh cattle the Anglesey are the most prized, because they are heavier than others, and retain their old characteristics in the greatest degree. The Pembrokeshire cattle he describes as very similar to the Anglesey, but longer in the leg and horn, not so good to the touch, and generally deep in front and light behind; whilst in colour they should not have the white udders, &c., of the Anglesey breed, but should be quite black in those parts. Many of them have a tinge of russet-brown on the sides. They have, but in lesser degree, the high rump common to the black Welsh breeds, and are, like the Anglesey cattle, very hardy, easy to fatten, attaining to great weights, very docile, and good milkers. The milking record of his own champion Anglesey cow, Black Queen 2nd, was 18 quarts daily, with 23 per cent. of cream, three months after calving. Captain Ross's pedigree Welsh cow, which, at the London Dairy Show, in 1884, won the Lord Mayor's champion prize against all breeds, excepting Shorthorn and Channel Islands, yielded over 20 quarts, with 26 per cent. of cream. In Mr. Harvey's mixed herd of Anglesey and Pembrokeshire cows, upon his Pembrokeshire farm, the yield of some of his cows had been occasionally tested, separately, and had proved up to 10lb. or 11lb. of butter in the week, never more; but he had known black Welsh cows, in places where not more than two were kept, give each as much as 14lb. of butter in the week.

A few of the weights of Anglesey and Pembrokeshire cattle, casually ascertained, are recorded in the South Wales Herd Book, Colonel Platt's pamphlet, and elsewhere, showing that both are capable of development to ample bulk; and at the Smithfield Club Shows the live weight of three-year-old steers frequently approaches, and sometimes exceeds, 2,500 lb.

The County of Glamorgan gave its name to an ancient breed of cattle of doubtful origin. Some writers have maintained that the source was partly Norman, from a cross of Norman stock, imported in the twelfth century, with the

breed previously established in the district; but this has been contested. A cross with the Devon has been also suggested as likely to have been introduced. These guesses, however, appear to have little, if any, support from known facts. Down to the close of the last century, the breed, an excellent one, was kept pure. For some years after the beginning of the present century good specimens were plentiful; but from neglect and crossing it wasted away. It was valued most as a grazing breed, and for its fine teams of working oxen, but the cows were fair milkers. The leading characteristics of the breed were clean-shaped, tapering heads; a smart, lively outlook; longish and upturned horns; hair fine, but short. The colour once was red, with white markings, often a white face, and usually white along the back and under the body, but it gradually changed to a deep brown, and eventually to black. After mongrelism had nearly effaced the ancient type, strenuous efforts were made to restore it, and with some success; but they were not sufficiently general, nor long enough continued, to save the breed, which, between Hereford crosses to restore grazing properties, and Ayrshire to bring back the milk, soon ceased to possess any distinctness of character. Yet so lately as the year 1853, when the Royal Agricultural Society of England, at Gloucester, first provided classes for Welsh breeds, Glamorgans took the leading honours.

Another old Welsh breed was that of Montgomeryshire, of which, perhaps, a few pure specimens may be still found. About five-and-twenty years ago two pure herds were carefully maintained; and, in 1884, when the Royal Agricultural Society of England visited Shrewsbury, two heifers of the true type were exhibited by Mr. Elisha Pugh, of The Newton, Bishop's Castle, Shropshire, close to the Montgomeryshire boundary. The distinguishing peculiarity of the breed was the full red colour with "smoky" points, the red shading off to black on the face and tail. The character was quite distinct from that of any other Welsh breed, more like the

Sussex, but the Montgomeries were of smaller size and had shorter horns than Sussex cattle. They often deceived the best judges by their extraordinary dead weight.

The second appearance of Welsh cattle in special classes in the Royal Agricultural Society's Showyard was at the Battersea International Show, 1862, when the North and South Wales breeds had separate classes. At Manchester, 1869; Cardiff, 1872; Liverpool, 1877; Bristol, 1878; Kilburn International, 1879; York, 1883; and in each subsequent year, excepting Newcastle, 1887, the claim of the Welsh breeds to classes for themselves alone has been recognised by the Society. The Angleseys at Manchester, Castlemartins at Cardiff, both North and South Wales breeds at Liverpool, and again at Bristol, were exceedingly good; and at many of the subsequent shows the reputation of the Welsh breeds has been well maintained by the specimens sent into the ring.

Whilst prominent exhibitors, mostly of the wealthy classes, have done much both to improve and to support by their influence the breeds of cattle belonging to the Principality, the thrifty "small farmers" of Wales, a prudent rather than an adventurous race, have preserved the extraordinary stamina of those valuable breeds. More careful to hold the bird in the hand than anxious to risk it for two birds in the bush, they do not often venture much money, or spend much time, in exhibiting their stock at the shows, yet they are quietly doing their part towards the preservation and improvement of the Welsh black cattle. Keeping them true to breed and type, and under conditions favourable to the maintenance of their hardy nature, and of the accompanying readiness to turn to profitable account the plainest fare, they have in their hands always a vast reserve store of sound material available for future improvement. A well-known authority, Mr. Morgan Evans, writing in the *Live Stock Journal*, of December 28th, 1894, says of the Welsh cattle:—

"They are cattle for the grazier as well as for the butcher. It is a delight to see how quickly a herd of Welsh black

cattle, after having been foraged through the winter either in shed or field, grow sleek, fat, and comely when turned into a field of fresh clover or good old pasture. Winter or summer they are the best breed for their native hills and dales. When the sheds of a farm are on an inadequate scale they withstand the rigours of winter with impunity in the open field, and even grow prime fat in good meadow land with the assistance of a feed of corn and a scattering of hay morning and evening of each day. Young heifers and cows will often calve in the middle of the night, knee-deep in snow, and still be alive and kicking, healthy and strong. When also accommodation is ample, they take kindly to the stalls, and quickly respond to the care and fare bestowed on them."

(3) Kerry and Dexter.

The small breed of cattle known as the "true Kerry," has existed from time immemorial among the Kerry mountains in the West of Ireland. The small size, the character, and the colour of the Kerry, favour the opinion that it represents, with little variation, the aboriginal cattle of the country, identical in type with the small, dark-coloured ox of Ancient Britain. The Dexter breed is a modern variety of uncertain composition. Although red is mentioned by various authorities as a legitimate colour of the Kerry, both true and Dexter, and extensive white markings, even in the former, were allowed in past years, modern fancy favours the black colour, and narrowly limits the proportion of white.

In the year 1872, the *Journal of the Royal Agricultural Society of England* (vol. viii., s.s. part 2, page 1,) contained an able "Review of Irish Agriculture, chiefly with reference to the production of Live Stock," by the late R. Oliphant Pringle, at that time editor of the *Irish Farmers' Gazette*. Mr. Pringle had an exceptionally large and intimate knowledge of British live stock, and his long residences and popularity in Ireland (where he was twice settled naving in the interval an

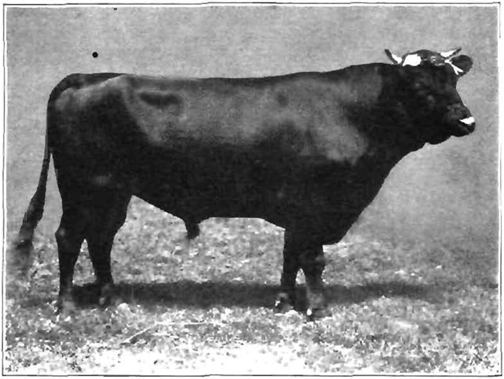
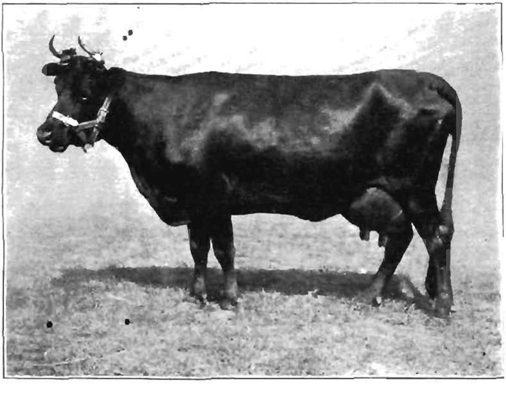


Photo by E. Babbage.

KERRY BULL.



KERRY COW.

editorial engagement of some years in Edinburgh), gave him a thorough acquaintance with Irish breeders and Irish breeds. In that "Review," he says:—

"The Kerry is, properly speaking, the only existing native breed of cattle [in Ireland]. There are two varieties of it, first, the true Kerry, and next, the 'Dexter.' The former is a light, neat, active animal, with fine and rather long limbs, narrow rump, fine, small head, lively projecting eye, full of fire and animation, with a fine white cocked horn, tipped with black, and in colour either black or red. Cattle of this description weigh, when fat, about 4 cwt., some even less; they fatten readily, and their beef is fine in the grain, and very rich in flavour. In quality of flesh, they resemble the finer classes of West Highlands. The cows yield rich milk, and the quantity which they give, combined with the ease with which they are kept, render them great favourites as 'fancy' cows in the case of families residing in suburban villas, and the like."

Mr. Pringle records the measurement of a Royal Dublin Society's prize fat Kerry cow:—Height at shoulder, 38 inches; girth, 70 inches; length from shoulder-top to tail-head, 42 inches; indicating a weight of about 30 stone (imperial). He describes the Dexter Kerry as the result of a cross, introduced about 50 years before that time, or between 70 and 80 years ago, by Mr. Dexter, Viscount Hawarden's agent, whom some writers call Captain Dexter, but the breed of the alleged cross was not known. Other authorities have thought that no cross was used, but that the new variety was obtained by selection only from the ordinary Kerry cattle. This seems improbable. The character of the Dexter differs much from that of the true Kerry, although some Dexters incline more than others to the Kerry type; but many cross-bred animals, without the least right to the name of Dexter, have been sold under that name. In the genuine Dexter there are wider differences of character than in the true and original Kerry breed, in which we find comparatively little variation from

one fixed type. Possibly the founder of the Dexter variety took the cross-bred cattle nearest at hand, without troubling himself about the composition of their blood, and from them developed his breed by selection. This suggestion, if not contradicted by existing evidence of a cross or crosses designedly introduced, gives room for compromise between the conflicting opinions upon the nature of Mr. Dexter's work. There is record of a local supposition that the variety originated in animals saved from a shipwreck on the Kerry coast; but this may be nothing more than a vestige of misty, mythic tradition, which seeks the origin of several of the breeds of ponies, cattle, and sheep of these islands in progenitors said to have come from the Armada's wrecks. The Dexter is described by Mr. Pringle as having a round, plump body, square behind; legs, short and thick, hoofs inclined inward; head, heavy, wanting the life and fineness of the true Kerry's head, and horns having a tendency to be long and straight. Lord Ashburton has pointed out a curious difference between the male and female Dexter in the growth of the horns, the bulls varying so greatly that in a showyard "it is hard to find two whose horns resemble each other either in make or shape"; whilst "the cows are nearly always better than the bulls" in the horn, their horns "differing comparatively little," and when good, being "nicely set on the head, sloping upwards and slightly forwards, level in shape and make." Lord Ashburton's general description of the Dexter, following Mr. Pringle's at the distance of twenty-three years, within which much renewed attention has been paid to the breed, differs in some particulars:—"In appearance a good Dexter should be long, and low on the leg, level along the back, with no inclination to 'humpiness' in the region of the tail; it should have a smallish head, well set on a pair of deep shoulders. In th cow the bag should be large and full, the teats well apart." In strict propriety the Dexter should be classed with the improved breeds in another section of this volume; but as it is linked with the true Kerry by the bonds of partnership in

the Herd Book, has joint interest with the Kerry in the support of an association formed in England, as we shall presently see, and frequently at some of the principal shows competes for prizes in the same classes with the true Kerry, we cannot conveniently here separate the kindred breeds.

That eminent authority upon all agricultural topics, the late Mr. John Chalmers Morton, writing upon Dairy Farming in the "Memoir of the Agriculture of England and Wales," prepared under the direction of the Royal Agricultural Society of England for the International Agricultural Congress at Paris in 1878, mentions the hardy and diminutive Kerry, red or black, as the only characteristic Irish breed, and as yielding rich milk, large in quantity for the size of the animals. A portrait of a Kerry heifer, bred by Mr. Robertson, of Santry, near Dublin, drawn by the late Mr. A. M. Williams, whose paintings and etchings of animals are always remarkable for faithfulness of likeness combined with artistic worth, illustrates Mr. Morton's account of the breed.

The Paris Exhibition of 1878 was an important event for the Kerry cattle, bringing them into notice more widely than they had been brought on any previous occasion. Messrs. William and James Macdonald, in their report upon the agricultural features of that show, referring to the dairy properties of the breed, say that twelve quarts of milk daily during the season, and from six to seven pounds of butter in the week, are the estimated average yield of a Kerry cow, and that cows have been known to give sixteen quarts every day for some time after calving. They describe the Kerry beef as of the finest quality, and fair in quantity for the size of the animals. At full growth, well fed, the dead weight of a steer would be about 4 cwt. They record the measurement of a celebrated show bull, Busaco, belonging to Mr. James Robertson, of La Mancha, Co. Dublin, taken when the animal was shown as a two-year-old:—Height at shoulder top, 34 in.; shoulder-top to tail-end, 38 in.; girth behind shoulder, 50 in. Mr. Robertson, to whose reputation as a

prominent improver of the breed they pay a due tribute, and several members of his family, had the honour of introducing the Kerry cattle to the cosmopolitan public at Paris. To his initiative and support, indeed, principally, the breed owes its rapid rise in public favour. As a breeder and as an exhibitor he has both improved its general character and brought into notice its merits and capabilities; and, in addition to his breeding enterprise in Ireland, he established an English branch in the county of Warwick several years ago.

Mr. Pierce Mahony, of Kilmorna, North Kerry, was one of the most extensive breeders of Kerry cattle, and, at the same time, one of the most strict in registering pedigrees and rejecting animals of doubtful descent. He did very much in the way of establishing the breed on the higher and surer lines of distinctness and purity, and towards extending its acceptation upon the double claim of beauty and utility. His showyard specimens always attracted attention and won high honours, including gold, silver, and bronze medals at the Paris Exhibition of 1889. In the same year the Queen's gold medal at the Windsor Jubilee Show was won by the Earl of Clonmell's bull, Paddy Blake; the reserved number being that of the first-prize cow, Venus, shown by Mr. Richard Barter, of St. Ann's Hill, Cork, whose name has long occupied a conspicuous place in connection with the distribution of both the true Kerry and the Dexter Kerry cattle, and is to be found in the prize lists of many of the chief exhibitions of live stock. Her Majesty's gold medal for the best Dexter also went into Ireland, adjudged to a La Mancha bull, Mr. James Robertson's Limelight, subsequently used by Mr. Swithinbank in his famous herd at Denham Court Home Farm, near Uxbridge. England was not far behind the country of origin in the competition for the medal, inasmuch as the reserved number for that highest honour belonged to the first-prize cow, Rosemary, exhibited by Mr. Martin J. Sutton, whose support of both the true and the Dexter Kerry, and his extensive multiplication of those breeds at Kidmore, Reading,

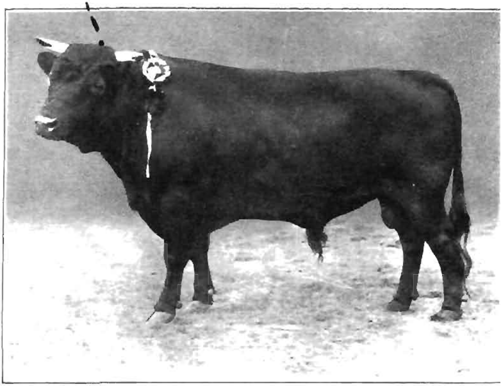
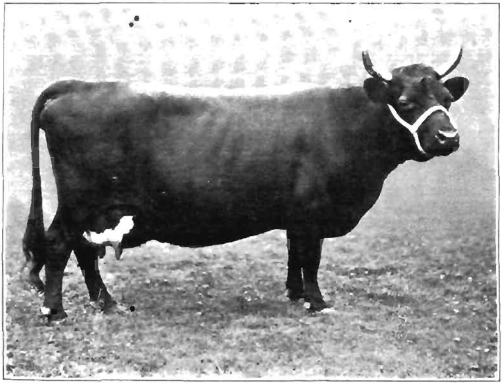


Photo by F. Babbage.

DEXTER BULL.



did very much to extend their popularity in England. His Dexter cow, Red Rose, weighing 762 lb., yielded in one year 4 tons 9 cwt. 3 qrs. and 2 lb. of milk, considerably more than thirteen times her own weight; and the second year of trial, 5 tons 9 cwt. and 8 lb., more than sixteen times her own weight. Mr. Sutton was understood to incline most favourably to the Dexter variety; and a decided partiality in the same direction is declared by Lord Ashburton, after a fair trial of both varieties at the Grange Home Farm, Alresford, Hampshire. On the other hand the true Kerry has its enthusiastic advocates, and seems to suit some places better than the Dexter.

Dexter cattle have found favour in the Royal Dairies, both of Windsor and of Sandringham. The late King Edward VII, when Prince of Wales, established a find herd at Sandringham and won many prizes, both at the summer and winter shows. The herd has been continued by King George V, and in recent years some admirable specimens have been exhibited. Lord Rosebery has imported large numbers of Kerry bullocks to graze upon his Buckingham estate, and some years ago introduced Kerry heifers, as dairy stock, with a pure Kerry bull. They not only proved excellent milkers, but also were found very useful in eating down coarse pasture in winter, thus greatly improving the following season's growth. Since that time the Kerries and Dexters have made their way much more extensively into the parks and pastures of English country seats, besides winning still wider acceptance with those dwellers in country or suburban houses, whose accommodation for an ordinary cow or two affords room for double the number of Kerries or Dexter Kerries. The quantity of rich milk which they yield in return for a comparatively small quantity of food, their generally excellent health, their lesser liability, it is said, than many other free-milking breeds to fall in milk fever, and their ready fitness for the climate of any part of England, are strong recommendations to amateur cowkeepers. As the number of cows kept may be increased,

perhaps doubled, when the little Kerry or Dexter takes the place of a large-framed common cow, the milk supply to the house can be more evenly distributed over the year; and with this addition to the numerical strength of the little dairy stock there is the great advantage of having always a fair proportion of the richer milk of the later, and more abundant milk of the earlier half of the period of milking; for where three or four cows are kept, under average good management (barring casualties which may be overcome by an occasional purchase), the dates of calving may be so regulated as constantly to have at least one cow in "full milk."

In the year 1887 a register was opened in Dublin by the proprietors of the *Farmers' Gazette*; and in 1890 the Royal Dublin Society, having in the meantime acquired the register, issued the first volume of the "Kerry and Dexter Herd Book," containing an account of the cattle, written by Mr. R. J. Moss, the Society's registrar, and the pedigrees of 118 bulls and 943 cows of the Kerry, and 26 bulls and 210 cows of the Dexter variety. An inspection of animals offered for entry had been held at Killarney in 1889, and became an annual institution so long as special selection should be deemed necessary. The same Society continues the publication of the Herd Book. In November, 1891, a meeting at Killarney resolved to take steps to form an association of Kerry and Dexter breeders. In England the friends of the Kerries shortly afterwards took action, and on December 6th, 1892, a meeting of breeders, under the presidency of Mr. Adeane, of Babraham Hall, at the Smithfield Club Show, resulted in the establishment of the Kerry and Dexter Kerry Cattle Society, which has its offices in London, Messrs. T. W. Hammond and L. J. Craufurd, 19, Bloomsbury Square, W.C., being the Secretaries.

For crossing with the heavier breeds to produce grazing stock of convenient size, with the most readily-saleable joints of beef, the Kerry is likely to become exceedingly useful. Mr. James Macdonald (in the *Royal Agricultural Society of*

England Journal, 1883, part 1) gives details of experiments in Shorthorn-Kerry crosses carried out by Mr. E. J. Smith, of Islanmore, Ireland, about twenty-five years ago, and Mr. James Bogue forty-five years ago. Mr. William Hooper (*Farmers' Gazette*, Dublin), in one of his interesting papers upon Kerries and Dexters written for the *Live Stock Journal Almanac*, records the very successful results of crosses of the Polled Angus upon the Kerry in Mr. Robertson's experiments at La Mancha, and suggests an experimental cross of the Kerry cow and the Red Polled bull, as likely to give better dairy results, although, for beef, the Aberdeen-Angus cross produced "just the kind that the feeder wants"—small polled cattle of prime quality; and some steers of the Hereford-Kerry cross have come out profitable feeders and good butcher's bullocks. Mr. W. J. Malden, of Cardington, Bedford, in the third part of the *Journal of the Royal Agricultural Society of England* for 1894, gives interesting particulars of crosses between the Dexter Kerry and the Indian Zebu (humped), the Shorthorn, the Polled Angus, and the Jersey breeds respectively. The true Kerry and the Jersey breeds "appeared antagonistic," and offspring disappointed the experimenter. The Dexter was then substituted for the Kerry, with satisfactory results.

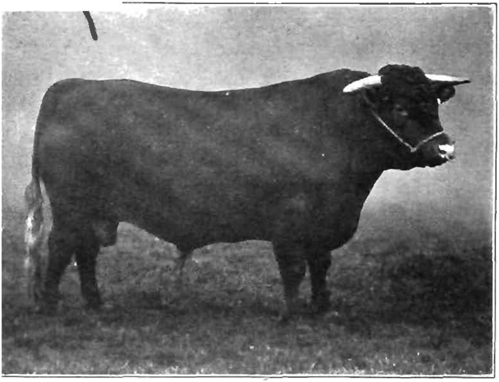
(4) Devon.

The Devon is believed to be a breed of very ancient origin, preserved for many centuries, mostly within a small area of the counties of Devon and Somerset. About 100 years ago, Lord Somerville, then the great authority upon the Devons in their own district, gave to Arthur Young, on one of his tours in the West of England, a precise statement of the limits within which the breed was maintained in its purity in that day. Beginning in North Devon, at Barnstaple, or rather at the mouth of the river Taw, six miles below the town, he drew his line up the river to Chumleigh, across the country eastward to Tiverton, and bearing off a little to the

left, over the county boundary into Somersetshire, through Wellington, nearly to Taunton, gave it near that town a turn to the north, past the eastern end of the Quantock Hills, and so still northward through Stogursey to the sea. The district bounded by this line on the south and east, and by the coast line on the north and west, comprises an area of about forty-five miles in length from east to west, and about twenty-two miles across from north to south at the widest part, which is from Minehead, on the coast, to Tiverton inland. This was the great Devon-breeding district, of which the western part belongs to the northern division of Devonshire, and the eastern part to west Somersetshire. The counties of Devon and Somerset, therefore, share the honour of owning the home and nursery of the breed.

Devon cattle, now widely distributed, and having a readiness to adapt themselves to local conditions, vary considerably in size and type in different parts of the country, and in different countries. Roughly, they may be classed as the larger and smaller varieties, which are frequently, however, inter-crossed. Some of the finest animals, undoubtedly, have been bred by the blending of the two principal sub-types; yet for fixed uniformity in a herd, there is no practice like constant breeding from cattle of only one type, that being selected which best suits the place.

From its characteristic fineness of face and bone, the Devon is often classed with the descendants of the small aboriginal breed of British cattle (Owen's *longifrons*); yet indications of a cross with a larger race, probably at a remote period, are believed to be traceable. If that be so, the selection of cattle for different districts and different purposes might well bring out, sometimes the distinguishing peculiarities of the smaller, sometimes those of the larger race of progenitors. We may reasonably suppose, too, that a mixed origin, or an origin in a direct cross of diverse races, would be favourable to the aptitude of the Devon to accommodate itself to circumstances. An aboriginal race without alloy would be likely to



Devon Bull.

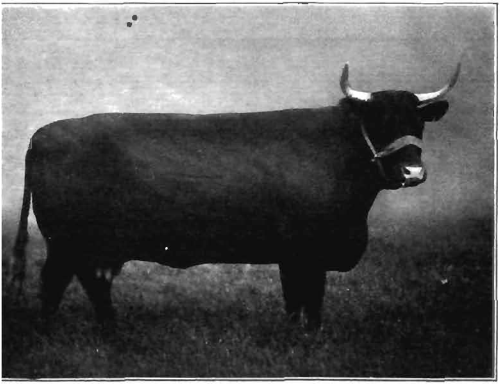


Photo by G. H. Parsons.

prove much more stubborn in its resistance to new influences than a compound of different races brought together from different conditions of existence.

Whatever its origin, and whether single or compound, the Devon, subject to local variations, has a well-fixed type, and is constantly of a whole red colour. The red, indeed, varies from the darker shades to a pale yellowish, or tawny; but the richer, deeper colour is most in favour. Some breeders, nevertheless, praise the yellow-red Devons as thrivers; many graziers like them because they find them disposed to fatten rapidly and at little cost; yet in some Devon-breeding districts an impression prevails that they are more delicate than those of dark colour. In Somersetshire an intelligent farmer told me that he always found the yellow-red cattle subject to scour upon land on the blue lias, but never delicate elsewhere.

The standard of excellence established by the Devon Cattle Breeders' Society places registered pedigree at the top of the list of requisites; and for perfect personal merit prescribes for the cow a head of moderate length with a broad, indented forehead, tapering considerably towards the nostrils, which should be high and open; the nose creamy white; jaws and throat clean; eyes bright, lively and prominent, and the expression gentle and intelligent; ears thin; horns long, well matched, and spreading, gracefully turned up, of a waxy colour, tipped with a darker shade. The neck should be of medium length, and, as described in the exact words of the standard, "growing from the head to the shoulders and spreading out to meet them;" the withers, fine; shoulders, flat, sloping and well covered; ribs, well sprung from the backbone, nicely arched, deep, and "fully developed"; back straight and level from the withers to the tail; loin broad and full; hips of medium width and level with the back; rump level and moderately long; hind-quarters deep, thick, and square. The tail should be thick at the root and tapering, with "a brush of strong hair, reaching to the hocks and hanging at right angles with

the back"; the udder not fleshy, coming well forward in line with the under part of the body and well up behind (that is, long from front to rear, rather than deep and pendulous); teats moderately large and squarely placed (the latter implying ample width, so that we have length and width indicated by the standard as preferable to depth of the udder); the underline of the body as nearly as possible parallel with the topline; the "legs straight, squarely placed when viewed from behind," and "not to cross or sweep when walking." The skin should be moderately thick and should be mellow; the hair rich, mossy, and of a red colour, white about the udder admissible, but not to extend forward beyond the navel, nor be found on the outside of the flanks, nor on any other part of the body.

The points of the bull are described in terms identical with those used in the standard of female excellence, with a few necessary exceptions on account of characteristics peculiar to the sexes. Thus the bull's head is described as masculine, with broad forehead, tapering to the nose, which should be flesh-coloured; nostrils, like the cow's, high and open; muzzle broad; eyes full and placid; ears of medium size and thickness, fringed with hair; horns growing at right angles from the head or slightly elevated, stout and waxy at the base, tipped with a darker shade. The cheek full, and broad at the root of the tongue; throat clean. The description of the neck is the same as in the standard for cows, with the sole difference that the bull's should be also muscular. The bull's chest must be deep, broad and somewhat circular; the rumps like those of the cow, and "full" is added; but perhaps the omission of this word from the female standard is undesigned. Then the arms and thighs of the bull should be muscular. The description of the colour is the same for the bull as for the cow, the distinctions of sex making the only difference in the words.

Between this standard and early descriptions of the Devon breed, the differences are slight, excepting those which have

become necessary in consequence of the disappearance of the ox-team, and the greater attention devoted generally to beef points. The dairy properties have also, to a much larger extent than formerly, received attention within the last half-century. The oldest notices and portraits of genuine Devons show the same type which we now see in Devon herds, and which, tradition asserts, has existed in the West of England for centuries.

Particulars of the progress of the Devon breed within the last 100 years, together with such evidences of its antiquity as long and painstaking research disclosed, will be found in Mr. Sinclair's "History of the Devon Breed of Cattle," published by Vinton & Co., in May, 1893, for the Devon Cattle Breeders' Society. From the information there gathered it appears that North Devon farmers of the last century, and their next door Somerset neighbours, possessed an old breed of cattle of rare excellence as regards grazing properties and the quality of their beef, and second to none for the yoke. During the wars, which raised the prices of agricultural produce, many farmers were short-sighted enough to sell their best cattle to the grazier or butcher, when a trifle more than ordinary market price could be realised, and so the great majority of choice Devons left the district, until the breed, drained of the choicest specimens, was rapidly declining in merit, and would have degenerated, perhaps, past remedy, had not a few staunch breeders resolutely refused to allow the strength of their herds to be sapped. At the most critical period, when the destiny of the breed hung in the balance, and every weekly market-day, to say nothing of daily transactions at the homesteads, lessened the Devon's chance of prolonged existence, Mr. Francis Quartly appeared on the scene. About the year 1794 he turned the energy of his mind to the work of improvement. From that time the tide in the affairs of the Devon breed, which had been long ebbing, began to flow. A few breeders, as already said, had refused to sell all their best cattle. Francis Quartly did more than

the negative work of refusal to sell. Forestalling or outbidding the butcher and the stranger, he bought up, as far as he could do so, the remnant of the best, and so founded that herd, the influence of which—it is not extravagant praise to say—reversed the current of events, and so became the means of restoring the breed.

Francis Quartly was the youngest of three brothers, whose father, James Quartly, dying at Champson-in-Molland, near South Molton, in 1793, left to him the leasehold property and the herd. He began in the following year the systematic improvement of that herd, which his father had bred there from the year 1776. First adding to it by purchase the best cattle his neighbours would sell, he appears to have bred afterwards almost entirely within the Champson herd. His selections from outside are said to have been nearly all females, and his bulls home-bred. His brother, the Rev. William Quartly, an intelligent student of the principles of breeding and a good judge of Devons, established a herd of Devons of the Champson blood at West Molland, where he remained until 1816, when the land and stock were transferred, on a valuation, to his elder brother, Mr. Henry Quartly, who remained in possession, and continued the breeding of superior Devons until his death in 1840. Neither Francis Quartly nor his brother, the clergyman was married. Mr. Henry Quartly, the eldest of the three brothers, was the father of Messrs. James and John Quartly the former of whom succeeded him at West Molland, and became there a highly-distinguished breeder of Devons; whilst John, the younger son, succeeded his uncle Francis at Champson, and there maintained the high reputation of the family name as a Devon breeder. The following dates may be useful:—

1836. Sale of the Champson herd of Mr. Francis Quartly, on his retiring from business. Mr. John Quartly, his nephew, succeeded him upon the farm, and at the sale bought thirteen of the cows and heifers and one bull calf. Mr. Francis

Quartly remained with his nephew at Champson until his death in 1856, at the age of 92 years, but took no part in the management of the herd. 1840. Sale of the West Molland herd of Mr. Henry Quartly, on his death. Mr. James Quartly, his elder son, bought about twenty cows, heifers, and bulls, and, remaining at West Molland, interchanged with his brother John, at Champson, the use of bulls, until he (James) gave up farming in 1874. 1881. James Quartly died, without issue. 1894. John Quartly died, aged 86, succeeded by his son, Mr. Henry Quartly.* The immense successes of the brothers, James and John Quartly, as exhibitors of Devons, powerfully sustained the influence of the leading work of their uncle Francis, as the restorer and improver of the Devon breed, and the collateral work of their father, Mr. Henry Quartly, continuing that of his brother, the Rev. William Quartly. Mr. Henry Quartly (son of Mr. John Quartly and referred to above) died from an accident on April 18, 1896. He was highly esteemed as a man and as a neighbour, and his judgment and experience qualified him to sustain with credit the reputation of his family.

In the meantime the Davy family, at Rose Ash and Flitton, maintained first-rate herds of blood long in their possession. The Herd Book had its origin at Rose Ash, and foremost rank in the showyards was long maintained by the Devons of Flitton Barton. Mr. John Davy, born in or about the year 1706, died at Rose Ash, South Molton, North Devon, in 1790, when his choice herd was left to his two sons, Mr. John Tanner Davy, who retained his portion of it at Rose Ash, and Mr. William Davy, whose share of the herd went with him to Flitton Barton, North Molton. Mr. John Tanner Davy died in 1852, and was succeeded by his son, known as Colonel Davy, the founder of the "Devon Herd Book." Colonel Davy, born June 29th, 1828, and educated at Mount Radford School, Exeter, held successive commissions in the 1st Devon Militia from 1854 to 1877, when, on retiring, he was gazetted

Lieutenant-Colonel. He was also a Justice of the Peace for the County of Devon. In early life he had been an agricultural pupil of Mr. J. S. Bult, of Dodhill, Taunton, the well-known breeder of both Devon and Shorthorn cattle; so that in the training of the destined historian and genealogist of the Devons, there were none of the mind-cramping influences of exclusive partiality to a single breed. It is very conceivable that with daily access to the volumes of "Coates's Herd Book" on the bookshelves at Dodhill, and in his heart the interests of the Devon breeders, among whom his father then held a prominent place, young Davy saw the possibility of doing for the highly-deserving breed of his own county, and of the adjoining county of Somerset, a service like that which had been done about twenty years before for the breed of North-East Yorkshire and South Durham. On leaving Mr. Bult, he set to work collecting information for his intended Herd Book, and after much labour in obtaining and authenticating particulars of breeding and of prize winning, and arranging the matter for press, issued the first volume in the summer of 1851, the year before his father's death, that of the Royal Agricultural Society's first visit to Windsor. Eight volumes of the Herd Book were brought out by Col. Davy, the last of the series in the year 1881. In 1883, Messrs. Hawkes and Risdon, auctioneers, of Williton, Somerset, acquired the copyright of the Herd Book, which they shortly afterwards transferred to the newly-established Devon Cattle Breeders' Society, of which Mr. John Risdon was appointed secretary. He brought to the work a large acquaintance with Devon pedigrees, and much study of various herd book systems, which enabled him to introduce the best features of other works of the kind. The first volume of the Society's series, ninth of the Herd Book, was published in the beginning of 1885. In the same year a supplement was issued, containing, with other matter, the birth list of calves in registered Devon herds in the year 1884, and particulars of important sales, and of prizes gained at shows, from 1850 to 1884 inclusive. A

supplement for 1885 appeared in 1886; the tenth volume, and a supplement for 1886, in 1887; and from that year a new volume has been issued annually, each containing the supplemental matter of the previous year. When Mr. John Risdon accepted the appointment of auctioneer to the Society, his son, Mr. John Risdon, Junior, of Wiveliscombe, Somerset, succeeded to the office of secretary, which he continues to hold.

Col. Davy, besides founding, and through eight volumes editing, the "Devon Herd Book," contributed to the advancement of Devon interests by his prize essay, entitled "A Short History of the Rise and Progress of the Devon Breed of Cattle," in the *Journal of the Royal Agricultural Society of England*, vol. v., s.s., part 1, p. 107; and by his lectnre on "The Devon Breed of Cattle," delivered at the Royal Agricultural College, Cirencester. He was also the writer of various essays on agricultural topics, and was a corresponding member of the New York State Agricultural Society, a member of the Council of the Bath and West of England Society, and a member of several leading agricultural associations, including the Royal Agricultural Society of England. He died on the 19th of April, 1887, in his fifty-ninth year. Kind-hearted, generous, in manner frank and genial, possessing more than ordinary conversational power, and actively associated with county and local business, he was much missed both in social life and public gatherings, and his memory is proportionately honoured in the circles in which he moved.

Whilst the Davy family at Rose Ash thus became so prominently connected with the advance of the Devons, the branch at Flitton Barton was aiding the progress of the breed by other yet very effective means. Mr. William Davy, the uncle, as we have seen, of Col. Davy, cultivated the dairy properties of the breed with much success, yet never lost sight of the most distinctive characteristics of the North Devon type, nor of the quality and wealth of flesh and the kindly thriving and fattening capabilities of the true breed. He died in 1840,

leaving to his son, James, the Flitton herd, which had sent winners to the county and local shows, and had produced the bull, Oxford 89, winner of the first prize at the first show of the Royal Agricultural Society of England, the Oxford Show, in 1839. In the hands of Mr. James Davy the herd rose to the topmost height of fame, producing the celebrated winners of the two gold medals at the Battersea International Show of the Royal Agricultural Society of England, in 1862, and many other animals distinguished in the showyards of the leading societies. The Flitton herd, on Mr. James Davy's death, in 1873, was left to his sister, Mrs. Maria Langdon, excepting five animals, left to Mr. W. Langdon, and purchased from him by Mrs. Langdon. After winning many prizes for Mrs. Langdon, the Flitton Devons passed by public and private sale into other herds; whilst the influence of the Flitton blood, widely distributed through the bulls, continues to be manifested in herds and showyards of the present time as an unexhausted power for good.

Among the early breeders whose herds have been mentioned by competent authorities as exceedingly good, were Messrs. Merson, of Brinsworthy, North Molton, maintained through several generations. The head of the family when the Rev. Henry Berry visited the district more than sixty years ago, and purchased from him, as also from one of the brothers Davy, some Devons for the Holkham herd, died shortly afterwards. In one of Mr. Berry's contributions to the *British Farmers' Magazine* in the year 1834, a warm tribute is paid to his memory. Mr. Richard Merson bred the bull exhibited by Mr. W. Porter at the second show of the Royal Agricultural Society of England, held at Cambridge, in 1840, which gained the first prize, and in commemoration of the honour received the name of Cambridge (Herd Book, 1st vol., No. 12). The success, however, reflected nearly equal credit on the Brinsworthy and Flitton herds, for whilst the bull's paternal ancestors were bred by Messrs. Merson, his dam and granddam were bred by Mr. William Davy.

Another breeder, contemporary with the Quartlys and Davys of the close of the last century, was Mr. James White Parsons, an enthusiast upon experiments in crossing, whose peculiar character of mind, short of genius, attained to distinguished oddity. Col. Davy has mentioned as breeders, who commendably retained their best animals through the tempting time of war prices, Messrs. Buckingham and Tapp, of Twitchen; Halse and Mogridge, of Molland; and Michael Thorne, of North Molton. Earl Fortescue's herd, through many changes around, was noted for beautiful specimens of the true type. Mr. George Turner's long career as a Devon breeder, who possessed animals of high excellence, began in 1818. About twenty years later, Mr. John Bodley, at Stockley Pomeroy, founded the herd which brought his name well to the front. Mr. Webber, of Halberton Court, kept up a good herd in the Tiverton district, into which he introduced the Quartly blood; and Sir Thomas Dyke Acland's herd at Hornicote had repeated infusions of the same celebrated strain. In Somersetshire were the well-known herds of Messrs. Boucher (of Greenway), Blake, Gatchell, Gibbs, Hancock (of Halse), Joyce, Longlands, Ocock, Tatham, and the Rev. C. Smith, besides others around Dunster Castle, where, in later years, Mr. Luttrell's herd remained a source of power; Mr. J. Hole also had a good herd at Knowle. In the Bridgwater district, Mr. Morley, of Cannington Park, established a herd of superior Devons; the Farthing family were largely instrumental in promoting the interests of Devon breeding. Mr. Walter Farthing for many years carrying off a large proportion of the principal honours of the shows; whilst at St. Audries, Sir Alexander Hood's herd was one of the Devon strongholds of that part of the county; and in the neighbourhood of Taunton, Messrs. Bult and Bond improved the larger but plainer sort of Devons then common in the Vale of Taunton Deane, by crossing with the best North Devon blood.

From Viscount Portman's herd at Bryanston, Blandford, many noted winners have been sent out.

One of the first to recognise the merits of the Devon in a distant county was Mr. Coke of Holkham, in Norfolk, created Viscount Coke and Earl of Leicester, of Holkham, in 1837, at the age of 83 years. He had a splendid Devon herd on the Holkham estate, and encouraged his tenantry to adopt the breed for both dairy and grazing purposes.

In Shropshire, Mr. William Childe, of Kinlet Hall, a gentleman of evidently highly cultured taste, as well as sound judgment, took up the Devon cause and gathered a good herd. In the year 1823 he was wise enough, and fortunate enough, to obtain from Mr. Francis Quartly a bull of extraordinary merit, both personally and as a sire, and of the high finish which marks established refinement of breed. That was the bull Prize 108, in whose recorded pedigree "Kinlet, Worcester" is in error given as Mr. Childe's address.

In Essex, in the latter part of the last century, Mr. Conyers, of Copt Hall, near Epping, had a dairy of Devon cows, founded by the purchase of twenty-four heifers and two bulls. The Duke of Bedford, at Woburn Abbey, Bedfordshire, and Earl Beauchamp, in Worcestershire, were early patrons of the Devon. The county of Warwick had a few breeders, and the Isle of Wight one or two. To the county of Dorset, however, was reserved the greater part of the honour of bringing out the great capabilities of the Devons, under suitable conditions, as dairy cattle.

A fine herd is kept at the Royal Farms, Windsor. Mr. Charles Morris, Highfield Hall, St. Albans, owns a very successful herd.

For the greatest weights of fat Devons we should turn to the records of the old working oxen of the larger old Somersetshire variety, and for the live weights of choice and highly fed steers of the present time, to the records of the Smithfield Club. The modern practice has been to improve the quality, and to grow a better return of weight per acre, rather than of weight per head of fat stock. One of the most perfect specimens on record of the fatted Devon was Mr. Samuel Kidner's

champion ox or steer of the Smithfield Club Show in 1876, bred by himself at Bickley, Somerset, and combining the North Devon with Somerset blood. The live weight of that ox at the age of four years and five weeks was about 19 cwt.

South Devon.

In that part of the southern division of Devonshire which lies along, and extends seaward from, the line of railway connecting Plymouth with the South-Eastern coast of the county, a breed of cattle, now called the South Devon breed, but long known by the local name of "South Hams," has sprung up, an offshoot from the true Devon, which also is extensively bred in the southern division. The wide variation of that breed from the Devon proper is ascribed, partly to climatic influences and other differences in the conditions of life, but also to the introduction of crosses. Still the red colour is maintained, and through all changes which the modern breed has undergone, evidences of its origin in the root of the ancient red breed of the county may be very clearly traced. It is a deep-milking breed, capable of meeting the grazier's, as well as the dairyman's demands, and is much valued in its own district, as especially suited to the land and climate. Mr. F. Punchard, in an article upon "Farming in Devon and Cornwall," contributed to the *Journal of the Royal Agricultural Society of England*, for September 30, 1890, said that a critical eye can at once detect a Guernsey cross in the breed, which he calls "The South Ham or South Hammer," and he mentioned characteristics betraying the cross, describing the animals as large-framed and useful, excellent milkers, making flesh rapidly at maturity, but as young stock not attractive in appearance, having too often the "razor back" and light yellow colour of the Guernsey. The general tone of the South Ham colour was some degrees paler than that of the North Devon and Somerset cattle, presumably from the blending of the Guernsey yellow with the ruby, blood-red, or

cherry-red, of the true Devon. Mr. Punchard referred to Mr. Tanner's account of the breed in the year 1845, and his remark therein that the South Ham, although a distinct breed, had been bred in so careless a way that no hope of improvement remained. A Guernsey cow, according to the frequent practice of the breeders of South Ham cattle, was kept with each ten or twelve South Ham cows to improve the quality of the milk and enrich its colour. This fact Mr. Punchard took hold of to enforce his contention that the Guernsey has a considerable part in the composition of the South Ham. He pointed to the probability that the Guernsey cows would breed to South Ham bulls, their heifers, retained and reared as milkers and for breeding, yielded offspring with two immediate crosses, or a proportion of three-fourths of South Ham blood, and the succeeding generations became so blended with the local breed as to be scarcely distinguishable from it. As the practice of keeping Guernseys appeared to have prevailed for some time, the Guernsey element must have increased gradually to a potent proportion in the South Hams, for it is hardly to be doubted that after a few years the descendants of the cross-bred cattle, distributed over the district, entered into many, most, or possibly all of the herds, and that in time all, or nearly all, of the South Ham bulls would have Guernsey blood in them, and so transmit to their offspring from Guernsey cows a proportion, in addition to the one-half derived from the dams. "The establishment of a herd-book," Mr. Punchard has shown, "would prevent future repetitions of this, though it might be at the expense of gradually losing the milking qualities which the cross has undoubtedly added."

An association called the South Devon Herd Book Society was fouuded shortly after Mr. Punchard's article in the Royal Journal was written, and has since issued the Herd Book. The first four volumes contained pedigrees of 548 bulls and 2,413 cows and heifers. The third volume had brought up the number of bulls to 378, cows and heifers 1,924, but in consequence of the small number of entries of animals born in 1893,

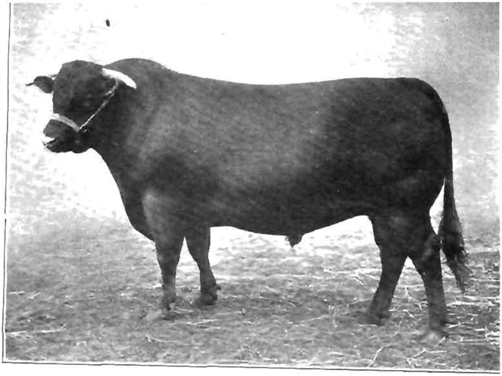


Photo by F. Babbage.

South Devon Bull.

South Devon Cow.

the issue of the fourth volume was delayed, an interim supplement being issued instead, containing the pedigrees of 59 bulls and 191 heifers. That supplement is now bound with Vol. IV., its contents taking precedence of the entries for 1894, which number 111 bulls and 298 heifers. The 250 animals o 1893 and 409 of 1894 making an addition of 659 to the 2,302 comprised in the first three volumes, give the aggregate of 2,961 entries of South Devons to the time of issue of Vol. IV. in the summer of 1895. Bulls are entered in alphabetical order, heifers under their breeders' names. All the animals, male and female, are numbered. The fourth volume and supplement are really of the nature of birth lists, the supplement containing only the births of 1893, the latter part of the fourth volume those of 1894, with a few exceptions to the rule of limiting admission to those calves which were born within the year. As examples, we have among the 1893 births, three births of 1892, and among those of 1894 are thirty-six of other years; the years ranging from 1890 to 1895, both included. This, no doubt, is so arranged that animals which have been omitted from entry in the list for the year of their birth, may be picked up by later lists, and those born within the current year not excluded until the issue of another volume. The sires of the animals, and sires' sires, and the dams in direct female line, without their sires, but having reference numbers whereby their pedigrees may be traced, appeared in the entries. Eighty-four breeders were contributors of pedigrees to the fourth volume and supplement. The Council of the Society consists of fifteen members, and Mr. Alfred Michelmore, of Totnes, is the Secretary.

(5) Sussex.

The Sussex breed, from its character, colour, and geographical position, may be very reasonably regarded as

related to the Devon by a common origin. Indeed the likeness of some of the Sussex cattle to living specimens of the large Somerset Devon of the old stamp, which within the last half century has become comparatively scarce, seems almost conclusive evidence of identity of source. Great improvement has been effected within the last thirty or forty years, but it is not improvement of the kind which affects our classification. It is not improvement by mingling breeds, as in the cases of the Shorthorn and the Ayrshire. It is not improvement by a sudden and drastic change in the system of breeding, as in the case of the Longhorn in Bakewell's day. It is an improvement effected, mostly or wholly, within the old working Sussex breed, by the gradual and ordinary process of selection chiefly for beef, instead of selection chiefly for power and endurance in labour. In former times good working oxen were wanted, and beef was secondary. At the present time, beef is the principal thing in the estimation of Sussex breeders.

Still, in long bygone years, many of the red cattle of the wealds were animals of much size and substance, and in their labour the oxen were treated with care not to spoil them as beef-makers eventually; and some of the cows appear to have been fair milkers, although milk is not a prominent excellence of the breed in these later days. Arthur Young, in his "General View of the Agriculture of the County of Sussex," dated 1793, says:—

"The cattle in this county are universally allowed to be equal to any in the kingdom. . . . . The true cow has a deep red colour, the hair fine, and the skin mellow, thin, and soft; a small head, a fine horn, thin, clean and transparent, which should run out horizontally and afterwards turn up at the tips; the neck very thin and clean made, a small leg; a straight top and bottom with round and springing ribs; thick chine; loin, hips and rump, wide; the projection of the round bone is a defect, as the cattle subject to this are usually coarse; shoulder flat, but the projection of

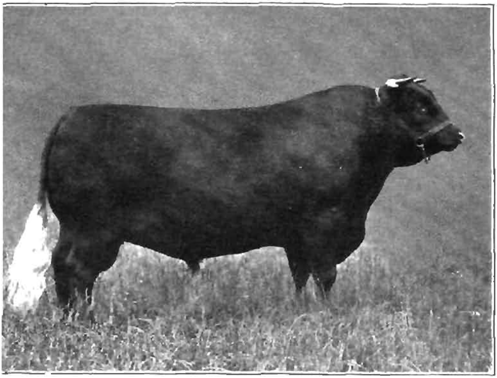
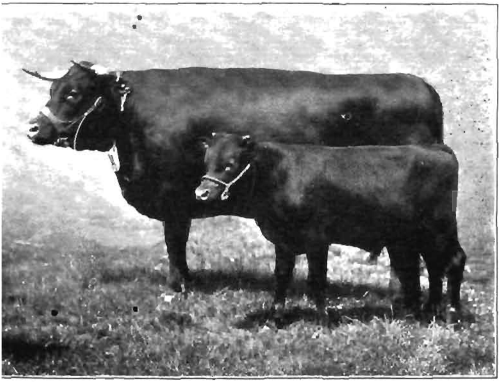


Photo by F. Babbage.

SUSSEX BULL.



SUSSEX COW.

the point of the shoulders not liked; the legs should be rather short; carcass not large; the tail should be level with the rump; a ridged backbone, thin and hollow chines, are great defects in this breed. The cow gives usually from one to two gallons of milk at a meal, and from three to four pounds of butter in the summer per week; but butter and milk are no objects where the system of raising their young stock is so well understood, and so much more profitable."

George Culley, contemporary with Young, as a writer, has made one description stand for "the Sussex and Herefordshire Cattle," classed together by him as "varieties of the Devonshire, the Herefordshire being the largest." The description, however, was contributed by Mr. Ellman, of Glynde, and evidently intended to be applied only to the Sussex Cattle of the latter part of the last century, and not to the Hereford breed, which at the time of Ellman's correspondence with Culley had both the mottled and the white face. Not only by the name of the authority quoted, but also by the description of the cattle, contained in the two following paragraphs, the Sussex breed only is indicated:—

"Colour red, fine hair and very thin skin, neck and head clean, horns neither long nor short, rather turning up at the points; in general well made in the hind quarters, wide across the hips, rump and sirloin, but narrow on the chine; tolerably straight along the back; ribs or sides lying too flat; thin in the thigh and bone not large. An ox, six years old when fat, will weigh from 60 to 100 st. (14 lb. to the st.), the fore-quarters generally the heaviest. The oxen are mostly worked from 3 to 6 years old, sometimes 7, when they are turned off for feeding.

"The calves run with the cows till they are 11 or 12 weeks old, when they are weaned and turned to grass. A good cow, after the calf is taken from her (if well kept), will produce from six to eight pounds of butter a week, for three or four months after taking off the calf, and double that quantity of skimmed milk cheese. They do not give so large a quantity of milk as the Suffolk cattle, but it is much richer in quality."

Youatt (*Cattle*, 1844), quoting Lord Sheffield, has described two types of Sussex cattle; the smaller the true Sussex of many a century, stepping out light and fast, believed to be of the same original stock as the Devon; the larger and slower breed differing little from the Hereford, beyond the difference of colour, the whole red being as common to the Sussex as the distinctive white markings to the Hereford. The larger breed is supposed to owe its origin to a mixture of the old Sussex with breeds which on richer pasture had acquired greater size. The speed, labour-power and endurance of the working Sussex oxen were remarkable. Those of the lighter-framed, more active, and according to tradition the purer breed, could almost rival horses in the amount of daily work, and perhaps often beat them at dead pulls. Some teams had been known to travel fifteen miles a day, drawing heavy loads, without distress, week after week; and as a proof of speed, a Sussex ox ran the Lewes race-course, four miles, in sixteen minutes. Harnessed like horses, they obeyed the rein just as readily as horses. Spayed heifers were occasionally used for the plough and for general draught. Old oxen that had worked their full time, whilst they did not fatten as well as younger and less hard-worked animals, often made great weights, sometimes up to 210 st. The average weight at Smithfield in those days is given as 120 st., but some extraordinary specimens weighed up to 216 st., or, at 14 lb. to the st., 27 cwt.

If we desire to compare those weights with the recorded weights of Sussex cattle shown at the Agricultural Hall (Smithfield Club Show), in recent years, we must bear in mind the fact that the heaviest weights here quoted are those of oxen which had worked to the age of six or seven years, and had been then fed off. This feeding, probably, in few cases, was what we should call, in these days, extravagant. The animals of average weight, we may assume, were merely good fat beef, nothing more. Those of enormous weights may have received extra preparation for the Smithfield Market by

owners who felt some pride in sending occasionally a wonderful ox. If the steers of the Smithfield Club Show have been longer and more highly fed for exhibition, the oxen of those days had got their full growth, and abundance of lean flesh, which with the addition of fat gained in the usual course of feeding off, would make them much outweigh the show steers of these days. We see proportionately great difference in other breeds, between the ponderous oxen of ripe age and condition singled out for record in former times, and the quickly-matured steers of the present time. The averages of the Sussex steers between three and four years old, exhibited at the Smithfield Club Show from eleven to fourteen years ago, taken over four consecutive years, show a general average weight of about 18½ cwt., at a general average age of about 3½ years. The greatest weight recorded within the four years —1882-3-4-5—was 21½ cwt., at three years and eight months old, that of a pedigree steer, bred, and in 1884 exhibited, by Mr. Kilpatrick, of Horton Park, Hythe.

In the year 1876, Mr. W. M. Stanford's steer, highly commended at Islington, weighed 21 cwt., 3 qrs. 11lbs., at the age of 3 years and 11 months, and at the same show some of the steers in the class for ages not exceeding 3 years and 3 months weighed quite as well proportionately to their ages. Captain Taylor's first-prize steer, 3 years and 1 month old, was 10 lbs. over a ton in weight at the show, and Messrs. John and Alfred Heasman's steer, at 2 years and 11 months, exactly 1 ton. These, although sometimes exceeded in the Sussex classes, are great weights, and considered in connection with the quality of the beef produced, and the cheap cost of rearing and keeping Sussex cattle, which are always ready to make the best use of the roughest and poorest pasture, illustrate the value of the breed as graziers' cattle.

The Sussex breed has maintained a highly creditable position at the shows from a very early period. Not only, as a beef breed, has it gained a long succession of honours at the fat-stock shows; but at the shows of the Royal Agricultural

Society of England, from the first, its right to rank among the principal breeds of the kingdom has been indisputably established. When the Society held its first meeting, in the year 1839, at Oxford, the only breeds to which separate classes were allowed were the Shorthorn, Hereford and Devon breeds. All others competed for the premiums offered for "any breed or cross not qualified for the foregoing classes." In the general competition of all but the three specified breeds, the premium for the best cow in milk was awarded to Mr. J. Putland of Firle, near Lewes, for his pure Sussex cow. At the Society's second meeting, held at Cambridge in 1840, the same exhibitor won the £30 premium for the best bull, the £15 premium for the best cow, the £15 premium for the best two-year-old in-calf heifer, and premiums of £10 each for the best yearling heifer and the best bull calf, all of the pure Sussex breed, shown against all breeds excepting Shorthorn, Hereford and Devon. Down to the year 1850 inclusive, the mixed classes only were open to Sussex cattle. In 1848, at York, and far from the home of the breed, the £25 prize for the best bull was awarded to one of pure Sussex blood, bred by Mr. J. V. Sbelley, of Maresfield Park, and shown by Mr. E. Cane, of Berwick Court, Lewes. In 1850, at Exeter, the Sussex cow and bull of Mr. James Gorringe, also from Lewes district, were the winners. Special Sussex classes were first granted by the Society for the Windsor Show in 1851, when the entries numbered 4 of aged bulls, 5 of bulls not exceeding 3 years' old; 6 of cows, 3 of two-year-old heifers, and 4 of yearling heifers, making a total of 22 entries. The premium for the best aged bull was adjudged to one shown by Mr. Catt, of Firle; Mr. John Waters, of Motcomb, gained the premium for the best bull in the younger class; Mr. Thomas Child, of Michelham, for the best cow, and Mr. Wm. Marshall, of Bolney Place, Cuckfield, the premiums for the best two-year-old and yearling heifers. In 1852 the Society's Show was held at Lewes, where the special classes for Sussex cattle contained 75 entries, and the county breed was not less

strong in quality than in number. Special classes, nevertheless, were not granted again until the Leeds meeting in 1861, although in mixed classes in the meantime the breed had come well to the front both at Gloucester and at Chelmsford. At the Battersea International Show, 1862, the Sussex cattle, in special classes, attracted much notice, and the official report of the stewards of stock, in the Society's Journal of that year, commended them for their exceedingly hardy character, and particularly as stock for poor and cold clay lands, whilst the judges praised them for their "fine deep flesh," and noticed the improvement which had been manifest at Smithfield some years previously and was fully maintained in the specimens exhibited at Battersea. The classes for Sussex cattle were continued until 1868 inclusive, excepting the two rinderpest years, when all cattle classes were suspended; but from 1868 to 1874, when they were again introduced, the Sussex breed was put back to the miscellaneous gathering; and even in 1874, at Bedford, the Sussex cattle, instead of immediately following the Devons, took their place behind those of the Channel Islands, and they remained there until at Bristol, in 1878, they were restored to the fourth place. The next was the International Show at Kilburn, in 1879, when, by the well-encouraged efforts of breeders to make an extraordinary display, such as the colonist and the foreigner would have reason to remember, nearly all British breeds of live stock and some foreign breeds were favourably represented. The Sussex breeders did their part well, and the Sussex classes have not been, since that time, withdrawn from the Society's annual schedule of prizes.

As a breed rises in merit and reputation, we find first one family, then another—here a notably impressive ire, there a dam remarkable as a breeder of excellent sires—becoming a centre of power for improvement, and as the influences of the foremost families or individuals extend in widening circles the breed gains ground. The Sussex breed of cattl- has many distinguished animals and families in its records; but

in a brief outline notice of the breed, and of its past and present chief characteristics, it is impossible to give a consecutive history of the various lines showing the sources and transmission of the highest merit. The Herd Book itself, valuable as it is as a guide, does not supply all necessary connecting links between the best Sussex cattle of to-day and those which were distinguished at the Royal Agricultural or the Smithfield Club Show in days long past. That work, founded some years ago by the private enterprise of Messrs. Heasman, themselves prominent breeders, supported by other Sussex breeders, was eventually acquired by the Sussex Herd Book Society, from whose offices, 12, Hanover Square, the volumes are now issued. The latest volume is the twenty-eighth of the entire series.

The progress of the breed at the Royal Agricultural Society's Shows indicates its rise in public favour; but the best exhibitions of Sussex cattle are found mostly at the shows held in the South of England. The Bath and West of England Society and Southern Counties Association, for instance, when its meetings are held within easy reach of the Sussex breeders, gives those breeders an opportunity, of which on certain occasions they have availed themselves very fully, to prove the great strength of their herds in the display of an immense aggregate of merit. At the more distant shows only a few specimens usually appear, and these, although good, give but a faint idea of what the breed really is in its own district. The herds should be seen at home, and they can well bear inspection.

CHAPTER III.

IMPROVED HORNED BREEDS.

LONGHORN.—Origin unknown—Supposed Continental Extraction—Bakewell's Improvement—Earlier Breeders—Sir T. Gresley—Welby—Webster—Bakewell's Character, Circumstances, and Work—Dishley Foundation Stock—Noted Bulls—Authorities Quoted—Description of Cattle—Shows—Kindred Breeds.

SHORTHORN.—A Composite Breed—Importations from Holland—Dobinson—Culley—Aislabie and Milbank Families—Sir W. St. Quintin, Sir J. Pennyman—Early Shorthorns Great Milkers—Description of the Improved Breed—Stephenson of Ketton—John Hunter—G. Snowdon—Hubback—Studley Bull—Early Breeders—Brothers Colling—Favourite—Alloy—Ketton and Barmpton Sales—Subsequent Breeders—Mr. Whitaker, G. Coates, and the Herd Book—Mr. Strafford—Shorthorn Society—C. Mason—Chilton Sale—T. Bates—Kirklevington Sale—Earl Ducie—Tortworth Sale—American Buyers—Prices in America—Animals sent to England—Messrs. Booth—Sir C. Knightley—The Windsor and Sandringham Herds—The Queen's Champion Shorthorns—Scotch and Irish Breeders—Col. Towneley—Mr. Bolden—Sale of the Grand Duchesses—Holker, Gaddesby, Dunmore, Aylesby and other Historical Sales—Depression—Revival—Warlaby Sale—Shorthorns in 1896—Lincolnshire Red Shorthorn.

HEREFORD.—Marshall's High Opinion—Cobbett's Equally High—Dairy Properties Secondary—Great Beef-making Breed—Description of the Breed—Marshall, Culley, Laurence, and old Portraits—Traditions of Origin—Lord Scudamore's Flemish Cattle—Early Historic Breeders—The Tomkins Improvement—Price of Ryall—John Hewer—Contemporary Breeders—Sir H. Hoskyns, Messrs. Jeffries, &c.—Their Successors—Early R.A.S.E. Winners—Sir David as a Sire—Lord Berwick's Herd—The Old Ashley Moor and Downton Castle Sort—Grey Herefords—The Turner Family—The Adforton Herd—Croome Court Herefords—Leinthall—

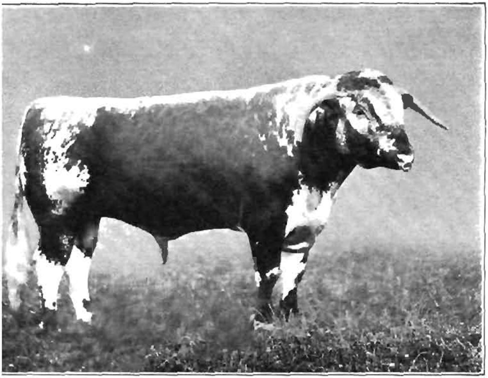
Other Well-known Names—Rev. J. R. Smythies' Advocacy—Messrs. J. and T. Rea, T. Roberts, J. Morris, J. Monkhouse, B Rogers, G. Pitt, T. Edwards, W. Taylor, J. B. Green, T. J Carwardine, &c.—The Fat Stock Shows—The Herd Book.

AYRSHIRE.—Native Locality—Adaptation to New Districts—A Dairy Breed—Sources and Date Doubtful—Supposed Crosses—Fixity of Type—Two Periods of Improvement—Description—Exports—Shows—Breed Society and Herd Book—Dairy and Milking Contest Records—Quantity and Quality of Milk, Butter, Cheese—*Profitable Return for Farmer's Expenditure.*

LONGHORN.

The old English and Irish Longhorn is a breed of very distinct type and of unknown origin. The size and general character of the cattle, their large horns, and the weight of bone of their unimproved ancestors 150 years ago, are evidences that they are not of the aboriginal British stock. That they are descended from large-framed cattle imported from the European continent some centuries ago is a popular and not unreasonable supposition; but the question whether their imported ancestors bore the same principal characteristics which now distinguish the breed, or whether the type had its origin in the British Islands, remains open. This was the first breed of cattle improved under Bakewell's system, by Bakewell himself.

Whatever the origin of the Longhorn, its character, in the rough, was fixed long before Bakewell's day. In Ireland and on the western side of England, but mostly in an area comprising the greater part of North Lancashire and South Westmoreland, and probably the whole of the Craven District of Yorkshire, the Old Longhorn, the prevailing breed, was, according to the oldest descriptions, flat-sided, rough in the shoulders, light in the hind quarters, lean-fleshed, thick-skinned, with thick leathery neck, slow of growth and slow in movement. The cows were usually fair, but seldom great, milkers; their milk, however, yielded a more than average proportion of cream. In those parts of England just mentioned, consider-



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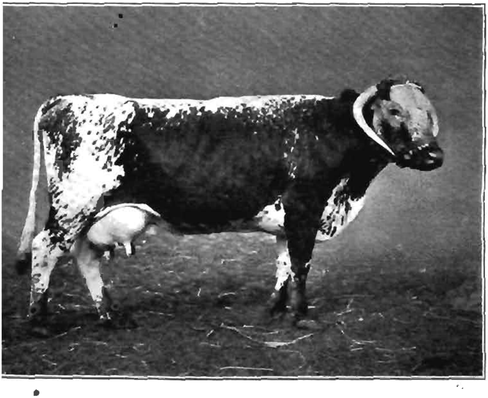
LONGHORN BULL.



LONGHORN COW.

able improvement in both dairy and grazing properties had been effected before the middle of the last century; but still more had been done in the Midland Counties, where also the breed was established. The name at the head of the list of pioneer improvers is that of Sir Thomas Gresley, of Drakelow House, Burton-on-Trent, east of the river Trent, and in the county of Derby. As early as the year 1720 the Drakelow herd had advanced to remarkable excellence and uniformity. The cattle were well matched in colour as in shape. Next to Sir Thomas were the Linton Blacksmith, Welby, on the borders of Leicestershire and Derbyshire, and Mr. Webster of Canley, near Coventry, in Warwickshire. Mr. Webster bred the celebrated bull, Bloxedge, whose sire was a Lancashire bull; and it was from the Canley herd that Bakewell selected the two foundation dams of his herd at Dishley Grange, in Leicestershire, his own birthplace.

Born early in the year 1726, the son of respectable parents, and belonging to an ancient family repeatedly represented by men holding important appointments in the learned professions and in diplomacy, Robert Bakewell was from early life an ardent student of husbandry, into which he himself introduced somewhat of the rudiments of science. With his father, who was, for his time, an advanced agriculturist, he had the advantage of seeing the best practice then known, and not a little that his father had either originated or greatly improved. But he inherited too much of his father's mental and physical energy to rest satisfied with past progress. He soon began to travel about the country, seeking acquaintance with farmers and farms, breeders and breeds of live stock in various districts, and at home he gave a fair trial to different breeds of stock and different systems of tillage seen in his travels. Thus, first assisting his father, then taking the larger share, and afterwards the whole, of the management of the farm, he eventually succeeded to the business, which he conducted rather to the furtherance of agriculture than his own interests. A man of generous hospitality, he kept

open house to all comers claiming an interest in agricultural science; and, as his experiments in husbandry and breeding were also costly, he was gazetted a bankrupt in November, 1776. This incident, however, did not occasion the dispersion of his herd, nor does it appear to have broken in any way the continuity of his business. He had established at Dishley, besides his herd of improved Longhorn cattle, the New Leicester breed of sheep, his own original production; also a magnificent breed of black draught horses (now absorbed into the Shire Horse breed of the country), and a breed of pigs.

Bakewell, although, as the host of Dishley Grange, always courteous and genial towards his guests, was by habit reticent in his intercourse with strangers upon matters concerning his business and experiments; hence he has been accused of wilfully concealing his principles of breeding and endeavouring to instil false notions concerning his practice. To men of experience and of frank mind, however, he appears to have been occasionally communicative, and his cardinal principles, that bone must be exchanged for flesh and shape moulded to carry the most flesh where it was most wanted, appear to have baffled, by their very simplicity, inquirers who went to Dishley in search of his grand secret. "The barrel shape," "The smaller the bone the truer the shape," "The weight in the right places," and "The greatest value in the smallest compass," were maxims appreciated by none but the more intelligent few of Bakewell's visitors. The rest missed the significance of the simple words, and, failing to elicit much further information than that the animals shown to them were mostly bred "in-and-in," a statement which aroused prejudice and antagonism, went away under the impression that their questions had been evaded and their credulity put to the test. With such persons, unprepared to receive his teaching, Bakewell apparently did not care to hold much discourse beyond that of social civility.

The foundation of the Dishley herd of Longhorns was laid about the middle of last century, by the purchase of two

heifers at Canley. One of them, named Comely, and known in Longhorn history as Old Comely, was slaughtered at the age of 26 years, and some years after her death Mr. Bakewell used to point to the four inches thickness of one layer of fat on her sirloin, preserved in pickle with parts of other noted animals, as long-lasting evidence of results effected, and for the purpose of comparing generation with generation. As a suitable consort for his two heifers, a bull was purchased in Westmoreland. From that bull and Comely he bred the celebrated bull Twopenny, of which Arthur Young, who saw the bull in the year 1770, says that he was a very large animal, most truly shaped, circular, or round-ribbed (barrel-form), but broad across the back. The bull named D, of both whose parents Twopenny was the sire, was considered even a better bull than Twopenny himself; and one of D's sons, Shakspeare, bred by Mr. Fowler, of Rollright, was an equally celebrated bull. He was sold at Mr. Paget's sale, November 14, 1793, for 400 gs. when 10 years old. Marshall described him as a striking specimen of natural variation, and as scarcely inheriting a single characteristic of the Longhorn, excepting his horns. In other points he had more the appearance of the Holderness or Teeswater cattle of that day.

From Marshall, Lawrence, Young, and other authorities who knew Bakewell, and had seen his cattle at Dishley, we gather the following particulars of the great breeder's views, and the character of his cattle. Breed was considered a condition of the first importance, and breed, in Bakewell's day, did not mean any number of generations of named and registered ancestors (no public breed-books existed in the last century), but it did mean the descent of animals from good ancestors, and the inheritance of the goodness of those ancestors. Therefore, associated with breed, were utility of form, good quality of flesh, and a propensity to fatten quickly. Bakewell's cattle were usually seen in high condition (one writer says, "as fat as bears"), and some of his visitors thought that he over-fed them for the purpose of making them

pass for much better cattle than they really were; but the best judges, who had ample opportunities of becoming acquainted with his stock and management, ascribed their high condition to their superior and hereditary aptitude to fatten. Even in ordinary cattle without pretension to superiority of breed, differences of thriving power are found. Bakewell's supposed "secret" was simply the pairing of animals which had most of that power, which he found to be correlative with fineness of bone. By in-breeding he kept the required characteristics when he had so developed them.

To the touch, the Dishley Longhorns were rich and mellow when lean, firm when fat. In form they had the barrel shape, tapering towards the ends, wide at the hips, but with very little prominence of the hip-bone, although in the later years of Bakewell's breeding they acquired a tendency to "cushion" or grow enormous masses of fat over the hips and hind-quarters. Their backs were straight, well filled behind the shoulder, necks long and fine, without loose skin or dewlap, heads fine and smooth, and horns long, tapering downward, and of a rich yellow colour. In some of these particulars the contrast to the old unimproved Longhorn is very strongly marked.

The colour of the Longhorn varies. Brindled red, with white markings, may be called the principal colour; but red, black, yellow and white, in different blends, combinations and contrasts, are all legitimate Longhorn colours, sometimes all fonnd on the skin of a single specimen. Black or blue-grey flecks on animals of a brindled or streaked red and white, or brindled yellow and white, are not uncommon, and a white back, or line down the back, is a very ordinary marking. Some animals have more or less white also on the lower part of the body.

Bakewell died on October 1st, 1795, having not quite completed his 70th year. His principal contemporaries, enumerated by Mr. J. B. Lythall in his historical notice of the breed prefixed to the first volume of the Longhorn

Herd Book (published in 1878), were Messrs. Buckley, of Normanton, Thomas Paget of Ibstock, Samuel Knowles, Richard Astley of Odstone, Thomas Taverner, Prinsep of Croxall, and George Chapman of Upton, who all used Dishley bulls. Messrs. Stone and Wilkes were also noted Longhorn breeders.

In the year 1876 the late Mr. Nevill Fitt contributed to the *Journal of the Royal Agricultural Society of England* an excellent account of the Longhorn, with dairy details up to date, showing the improved dairy properties of the breed and the superiority of the Longhorn for cheese-dairies. At one time Cheshire dairies were often stocked with Longhorn crosses.

At the Smithfield Club, at Birmingham, and other fat stock shows, the Longhorn has frequently proved its high capabilities as a beef breed. At the shows of the Royal Agricultural Society of England exclusive classes were not granted until the thirteenth, held at Windsor in 1851, yet in mixed competition the honours were repeatedly won, beginning with a prize for the best bull at the first show, in 1839. At Warwick, 1859, they had again their own classes, and made a grand show, and at Battersea (International), 1862, their excellent dairy properties commanded notice in the official report. Their next appearance in special classes was at Birmingham, 1876—a splendid show of them, when a marked advance in early development was seen in the heifers. Liverpool, 1877, and Bristol, 1878, and Kilburn (International), they had again separate classes, and at Kilburn two champion prizes of £25 each. The entries numbered forty-two, and the judges officially reported much merit in the three classes of bulls, the cows a grand class, two-year-old heifers excellent, and the whole class of yearling heifers commended. Classes were granted for Carlisle, 1880, Derby, 1881, Reading, 1882, York, 1883, and Shrewsbury, 1884, but not again until Windsor Jubilee Show, 1889, when the Queen added to the class prizes a gold medal for the best Longhorn. At War-

wick, 1892, the show of Longhorns was poor. At recent shows of the Royal Agricultural Society classes for Longhorns have been provided, and there is usually a good display at the Warwickshire show. A number of pure bred herds are still maintained in the Midland counties and elsewhere.

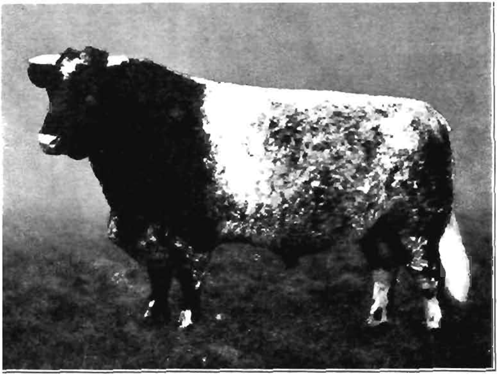
In the county of Cumberland, early in the nineteenth century, an old white-faced variety of the Longhorn was in favour.

The offices of the Longhorn Cattle Society are—Rectory Estate Office, Steeple Aston, Oxford, Mr. Bertram Worrall being Secretary.

SHORTHORN.

The Shorthorn, the prevailing English breed of cattle of the nineteenth century, must be classed with the "composite" or "made breeds." It is descended from herds of excellent cattle long preserved in the counties of York, Durham, and Northumberland; and upon unquestionable authority we learn that about the middle of the last century bulls selected in Holland by Mr. Michael Dobinson, a leading breeder in the county of Durham, became progenitors of an improved breed.

The importation of those Dutch bulls has been denied in recent years, and the denial is coupled with a statement that a statutory prohibition of the year 1666, rigidly enforced until the year 1801, made the importation of Dutch cattle into England impossible at any time between those years. But the fact that Dutch cattle were imported in the last century by Mr. Michael Dobinson and others is authoritatively recorded by George Culley, the official reporter of the Board of Trade upon the agricultural condition of more than one of the northern counties of England, a Durham county man by birth, and both in Durham and in Northumberland an advanced agriculturist and improver of live-stock. Culley himself remembered Mr. Dobinson, and vouches for that gentleman's importation of Dutch bulls "which were of much service in



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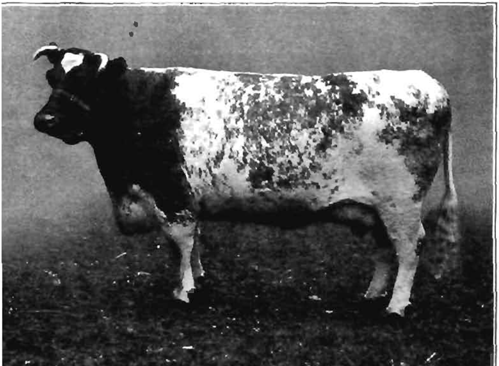
SHORTHORN BULL.



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SHORTHORN COW.

improving the breed," adding that Mr. Dobinson and his neighbours "were noted for having the best breed of Short-horn cattle, and sold their bulls and heifers at very great prices."

From an indefinitely early period the Aislabie family of Studley Royal, near Ripon, Yorkshire, possessed an excellent breed of Shorthorn cattle which, from repeated references to their colour by early authorities, appears to have been a white breed. The Studley cattle formed, if not the principal foundation-stock, certainly a large and important element in the composition of the Improved Shorthorn. From crossing with the yellow-red and the deeper-red cattle, the descendants of the Studley White Shorthorns are of all colours ranging from red to white, very beautiful shades of roan being easily obtained and much valued generally; although when two roan animals are paired, a tendency to revert to the red or to the white is very common. The Blackett family, formerly of Newbury Hall, also near Ripon, and the Milbank family, of Barningham, had fine herds allied to the Studley breed. On the Yorkshire wolds Sir William St. Quintin, of Scampston, who also is said to have imported bulls from Holland, and at Ormesby, in the Cleveland district of the same county, Sir John and Sir James Pennyman, were early and leading improvers.

From Culley's writings we learn that the Shorthorns of his day differed from other breeds in being wider and thicker, and in feeding to the greatest weight, and having by much the greatest quantity of tallow. They had "very thin hides, and much less hair upon them than any other breed, Alderneys excepted." These two last characteristics are very much changed since his time, for the hair is now plentiful in the best herds, and the hides are of quite medium thickness. The thin-hided, scanty-coated Shorthorns of that time were tenderer than the other breeds of cattle, excepting, again, the Alderneys, a name used in that day to cover Channel Islands and Brittany cattle indiscriminately. The

modern Shorthorn is much hardier than the Shorthorn of Culley's day. Although often still excellent for dairy purposes, the cow of the present day falls short of the twenty-four quarts daily which Culley mentions as the *average* in his time. Some Shorthorn cows, indeed, yield more than that quantity while in full milking, but the average is nothing like it.

To describe the modern Shorthorn we begin with the female, and take first that index to breed and character—the head. In the highest type of head the face shortish, broad across the eyes and forehead, generally a little hollow in the outline of the face, and decidedly so between the eyes, finely cut out, like artistic carving in wood or stone, down the face and round the muzzle; the nostrils large and open, cheeks not too fleshy, eyes bright but placid, horns wide set, and somewhat flat at the roots, growing outward at first, and as the animal advances in age forming gentle curves, which should not be immediately upward. The drooping horn is not generally liked, although it is not always in effect displeasing. A bend forward is considered preferable, and the points may incline either inward or upward. Matched horns are in favour, yet a well-shaped head with a sprightly outlook can bear differing horns without disadvantage to the whole effect. The horns and the muzzle should be light coloured and clear, the muzzle a palish buff, without stain of black, the horns yellow in the heifer, but naturally becoming lighter in the cow. Those of some old cows take a pale sea-green hue, with a polished quasi-transparency of surface. A little dark colour at the points is permitted, not commended. Real jet black and chalky white are objectionable horn colours. The throat, often "leathery" in the well-fed calf and yearling, should be somewhat fine, having but little loose skin under the root of the tongue, without any considerable length of light neck, in the mature animal. Almost immediately behind the head the sides of the neck should begin to swell towards the shoulder, where the flesh should evenly cover the shoulder-blades and hide the pro-

minence of the bones above the arm, technically called the shoulder-points. The ewe-neck is an ugly fault. In very heavily fleshed animals the out-shoulder—or ridge extending from the upper part of the shoulder-blade towards the shoulder-point, or junction of the shoulder-blade and lower shoulder-bone—has sometimes an immense depth of muscle. This may be considered excessive if the space before it is comparatively bare of flesh, but if that be amply covered, the disturbance of absolute evenness of surface may be pardoned. We find it in many of the best animals. The shoulder-blades should not be tightly laid in at the top, but free to open to the growth of flesh. The fore-rib, over the heart, if amply expanded and richly covered with flesh, fills the space behind the out-shoulder and below the crops. The floor of the chest should be proportionately wide, and padded with muscle and layers of fat, the fore-flank, or packing immediately behind the hoxter, big enough to fill, or more than fill, the hollow and the breast sufficiently prominent, substantial, full from arm to arm, and evenly shaped forward to the end. The line of the back must be strong, and generally straight, yet a slightly heaving line over the chine is permissible if the crops be wide and full; the ribs springing out well to give breadth of back for the beef. A good loin is broad, strong, deeply and evenly covered with flesh, thick at the nearly parallel edges (not rapidly narrowing forward, but square towards the ribs) and in the fatted animal in line with the width of the hips. In fat or lean animals the hip bones must be liberally covered, not bare, hard or sharp; each hip "cleft," and the hollow filled with elastic flesh. This is an important test of the quality of the animal, especially in the lean state. The hind quarters should be wide, well filled and moderately long, straight on the top, ending squarely, and the tail dropping perpendicularly at a right angle; the thighs thick and the "twist" (or filling over the back of the udder) very full; flank heavy; the under line of the body approximating to straight in the heifer, swelling gently as the cow advances in

age; the legs straight, wide set, and the fore and hind legs in line. The hair should be abundant and of mosslike softness.

The characteristics of the bull are those of the cow, adapted to difference of sex. The head has a bolder outline, inclining rather to the convex than to the concave; the horns are stronger, less bent and usually shorter than those of the cow, standing out wide from the back of the crown-ridge, and the broad forehead is plentifully covered with hair, wavy or curling; the eyes, prominent and lively, wide-set in largely rounded sockets, with a hollow between; the lower part of the face shortish and deeply cut out between the eye and the muzzle, although the outline of the nose may be somewhat high. The swelling outline over the bones surrounding the eyes, as seen in full profile, gives the rounder line of the bull's as compared with the cow's face, and the convexity is often continued to the muzzle. The ideal bull's neck is powerful, massive, rounded and thickly clothed with hair; but a false judgment, valuing the muscle between head and body as only so much inferior and undesirable beef, has tended to lower the masculine standard and to make too many bulls more like steers than stock sires. The bull's shoulders and breast should no more show feminine fineness than his hips and hind quarters should have the width and squareness of those of the cow. In his general character the bull—as compared with the cow—should be as the lion compared with the lioness.

Great length, in male or female, is commonly commended—"long and low," a frequent term of praise. Length, however, should be in fair proportion to depth and width, and duly divided over the fore, middle, and hinder parts.

In these particulars, the beef type of Shorthorn is principally considered. Between that and the dairy type, modification (corresponding in the two sexes) is gradual, the most distinctively dairy cow being lighter in the neck, often a little longer and narrower in the face, narrower and not so

deep in the chest, and proportionately wider and deeper in the hind quarters, with large milk-veins and udder; the best udder, however, not fleshy and permanently large, but of fine elastic skin, very considerably shrunk when empty. It should extend well forward, with teats evenly shaped and not too large, set wide apart.

We have now to trace connecting links between the older herds and those in which the modern improvement was effected, and the Shorthorn breed, as now known, established.

In the year 1731 a young farmer, named Stephenson, left the neighbourhood of Ormesby in Cleveland (Yorks), where the Pennyman influence had done much to promote the breeding of good cattle, taking with him to his new home,—at Ketton, near Darlington (Durham)—the foundation of a Shorthorn family, which he retained at Ketton until the year 1769, when he sold his herd, comprising the family descended from his Ormesby stock, and retired into Scotland. At his sale one of the Ormesby family, a small cow but a good milker, exceedingly neat and stylish, with remarkably long and straight hind quarters, uncommonly good hair, and a great tendency to fatten quickly, was purchased by Mr. John Hunter, of Hurworth, near Darlington. In his possession she bred, to a bull belonging to Mr. Banks, also of Hurworth, a daughter, also a small cow, short-legged, fine in all points, rich to the touch and an excellent milker.

In the year 1774, whilst Sir James Pennyman's work as an improver of the breed was still in full fruition, one of his tenants, *Mr. George Snowdon, took a farm at Hurworth,* and obtained as the nucleus of a herd six cows and a bull from Sir James's herd. From one of those cows, paired with Robson's Bull (registered 558, and again by the name of Waistell's Bull 669), Mr. Snowdon bred the bull registered as Snowdon's Bull 612; and this Snowdon's Bull, paired with Mr. John Hunter's cow by Banks's Bull, from the cow bought at Ketton in 1769, became the father of the bull Hubback (registered 319), described as "one of the most

remarkably quick feeders ever known," a bull with "clear waxy horns, mild bright eyes, a very pleasing countenance," and "handling quite superior to any bull of his day;" besides having a coat of "soft downy hair; and he retained it long in the summer." Bred by a bricklayer, and owned respectively by a timber merchant, a blacksmith, the blacksmith's son-in-law, and a fifth owner—who charged a shilling a cow for his services—he passed at the age of six years into the conjoint ownership of Mr. Robert Colling, of Barmpton and Mr. Waistell, of Ailey Hill. Afterwards he was resold by them at the price they had paid—eight guineas—to Mr. Charles Colling, of Ketton, who, after using him two or three years, sold him to a Mr. Hubback in Northumberland, in whose possession he remained to the age of fourteen years, fruitful to the last, and from whom he took his name.

Studley Bull 626, an ancestor of Hubback, is the most remote Shorthorn sire registered in Coates's Herd Book. Although the record does not give the date, other competent authority gives 1737 as the year of Studley Bull's birth. The bull, in colour red and white, was bred by Mr. Sharter, a son of the steward of Mr. Milbank, of Barningham, on the Yorkshire side of the Tees, whose noted herd was derived originally from the Studley breed. That Mr. Sharter, the steward's son, took Mr. Milbank's Chilton Farm, and obtained stock of the Barningham blood, from which he bred Studley Bull 626, a noble animal, described by persons who had seen him as remarkably great in the girth, and deep in the fore-quarters, with a neat frame on very short legs. His son, Studley White Bull 627, was also "a good bull, with extra good and large fore-quarters."

The next sire of great historical importance, after Studley Bull and Hubback, was Mr. Charles Colling's Favourite 252, a descendant of both those bulls, and grandson of a famous cow named Lady Maynard, but originally called Favourite, purchased from one of the best of the Teesdale breeders, Mr. Maynard of Eryholme, by Mr. Charles Colling. The

Brothers Colling, whose herds became the chief Shorthorn reservoirs, bred in-and-in from the bull Favourite so extensively as to increase his influence over that of any other sire. Since their time, consequently, the whole breed has been largely indebted to the blood of Favourite.

Among the names of early breeders who contributed much to the advance of the Shorthorn, prominence is due to those of Waistell, Charge, and Hill. Mr. Waistell of Great Burdon, near Darlington, was a man quite in advance of his day, improving the breed in the county of Durham at so early a period that in the year 1770 his herd was accounted one of the best on that side of the Tees. In this work, the directing judgment appears to have been of local birth, for it was after his success was gained that Bakewell's system became known to the Yorkshire and Durham breeders. Matthew Culley, the brother of George, first visited Bakewell in 1762; George went to Dishley in 1763, and from that time became the intimate friend and frequent travelling companion of Bakewell. The Culleys introduced Bakewellian principles and Dishley sheep, applied the former to the breeding of Shorthorns, and taught their neighbours, with the help of object lessons in the sheep of Bakewell's breed. The Dobinsons, however, as George Culley wrote, "first raised a spirit of emulation amongst the breeders" (in the Teesdale district), and they were ably followed by Mr. Christopher Hill of Blackwell, Mr. Waistell, and Messrs. John and Thomas Charge of Newton, Robert Charge of Lowfields, W. Charge, and others; but we must not forget that the Dobinsons had contemporaries, already mentioned, on whose behalf a claim to a share in the credit of the initiative may be justly urged.

The field was thus prepared for a rich harvest, reaped by the brothers, Robert and Charles Colling. Robert, born in 1749, died unmarried in 1820. Charles, born in 1750, died in 1836, childless but leaving a widow. They were the sons of Charles Colling of Skerningham, the exhibitor of the best breeding cow at the Durham Society's show at Darlington in

1784. At the same show Robert, then farming at Barmpton, exhibited the best ram. Mr. Charles Colling, senior, died early in 1785, and in the month of March in that year his son Charles, of Ketton, won the first prize at Durham for his bull afterwards named Hubback. Charles Colling's wife, whose maiden name was Colpitts, shared his tastes, and by her tact and judgment greatly assisted him in his enterprise as a Shorthorn breeder.

A question much debated at various times, now put aside as having been threshed out and found to yield much chaff but little corn, arose concerning Mr. Charles Colling's object in introducing a polled Galloway cross. A half-bred bull, whose sire was Bolingbroke and dam a red Galloway cow, became the sire of the bull named Grandson of Bolingbroke, whose dam was a pure Shorthorn. Grandson of Bolingbroke left two daughters—Lady, bred by Mr. Charles Colling from Phœnix, and Daisy, bred by Mr. Drinkrow. From those two cows, chiefly through their male descendants, the "alloy," as it has been termed, in course of time leavened the Shorthorn breed generally. Some of the disputants maintained that it was a designed improvement, their opponents contending that it was taken only to obtain a calf from a shy breeder. It became absorbed into the breed, like other alloys of which no notice was taken, and whether still influential for better or for worse, or attenuated to impotency, remains in fact an element in the composition of the Shorthorn.

The Ketton herd of Mr. Charles Colling was dispersed on October 11, 1810. The sale comprised 48 cows, heifers and bulls, including calves. The bull Comet 155, a remarkable product of extremely close in-breeding, realised 1,000 guineas. One of the bulls, Cupid, eleven years old and lame, was withdrawn. Of the animals sold:—

29 cows and heifers averaged ...	£140 4 7	=	£4,066 13 0
18 bulls and bull calves averaged ...	169 8 0	=	3,049 4 0
47 averaged £151 8s.	Total ...		£7,115 17 0

Mr. Robert Colling's herd at Barmpton was sold in two portions, the first on September 29th, 1818, when

51 cows and heifers averaged	... £111 13 0	=	£5,694 3 0
10 bulls and bull calves averaged ...	215 17 7	=	2,158 16 0
61 averaged £128 14s. 9d.	Total	...	£7,852 19 0

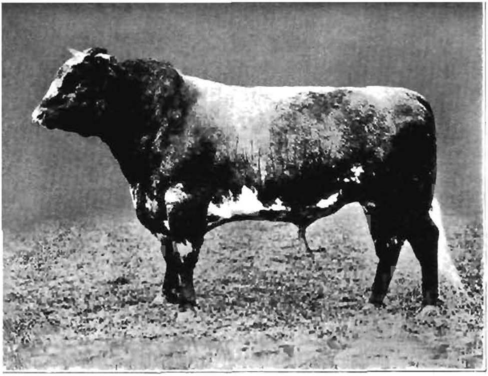
The remainder of the Barmpton herd was sold (after Mr. R. Colling's death) on October 3rd, 1820, with the following results:—

38 cows and heifers averaged	... £36 10 4	=	£1,387 11 6
8 bulls and bull calves averaged	... 110 15 6	=	886 4 0
46 averaged £49 8s. 7d.	Total	...	£2,273 15 6

Partly contemporary with Messrs. Robert and Charles Colling, and continuing the breeding of Shorthorns of their blood after the distribution of the Ketton and Barmpton herds, were Messrs. Thomas Booth, succeeded by his sons and further descendants to the present time; Thomas Bates, whose celebrated herd was dispersed after his death; Christopher Mason; William and other members of the Raine family; and Samuel Wiley. Mr. Duncombe, afterwards Lord Feversham, founded the Duncombe Park herd, still maintained by the present Earl of Feversham. Sir Henry Vane Tempest, of Wynyard Park, Stockton-on-Tees, held a prominent place among the early breeders, and was the first to propose to a public assembly the establishment of a Shorthorn Herd-book. The design had been by himself entertained, and in conference with Colonel Trotter and Mr. George Coates, of Driffield, discussed for some time before. It was unfolded in the year 1812 to the company at one of a series of periodical shows instituted and maintained by Sir Henry at Wynyard. Sir Henry's proposal, coupled with the handsome offer to supply the requisite funds, was warmly adopted. Mr. Coates—a prominent breeder from the old Milbank stock, and extensively acquainted with breeders, herds, and pedigrees of Shorthorns—was nominated and at once elected as editor, and promptly began to collect and

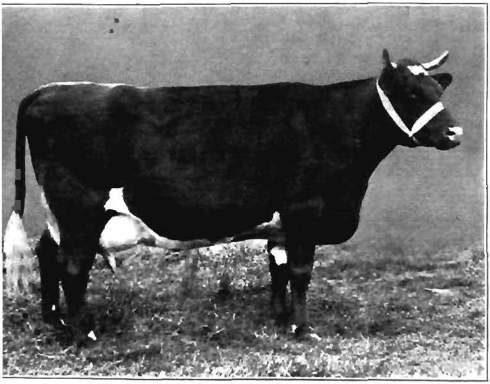
arrange materials. Whilst his work was in progress, and only a few months after the memorable day at Wynyard, Sir Henry died, and publication of the first volume was consequently delayed until ten years from the beginning of the public movement in the matter. In the meantime Mr. Robert Colling and Mr. Jonas Whitaker, the owner of an excellent herd of highly bred and deep-milking Shorthorns, stepped into the breach left by the death of Sir Henry Vane Tempest, and conjointly proffered the necessary pecuniary advances. Mr. Robert Colling's death in 1820 was a second cause of delay, but chiefly through Mr. Whitaker's support and influence, including the supply of money until the subscriptions became due, the work was fairly launched and the first volume issued in the year 1822. The first two volumes were edited by Mr. George Coates, assisted by his son, who bore the same name, and after his father's death brought out in succession the next three volumes. The property in "Coates's Herd Book," was then acquired by Mr. Henry Strafford, who produced the sixth volume, and successive volumes to the twentieth inclusive; then sold the copyright to the newly-formed Shorthorn Society of Great Britain and Ireland, whose first volume—the twenty-first of the Herd Book, comprising births to the close of 1874—was published in 1876. The twenty-second volume appeared early in 1877, and the twenty-third towards the end of the same year. From that time the volumes have followed one another annually, the fifty-ninth, with births to December 31, 1912, appearing in 1913. Bulls registered number 118,417.

The Shorthorn in the meantime passed to distant districts and other countries. First into Scotland and Ireland, then the United States of America, Canada, the Australian colonies, and several of the continental nations of Europe. France, about sixty years ago, began a series of considerable importations, and still has tribes, now extinct in England, preserved in that country for considerably more than half a century. The Government breeding establishments (*Vacheries*),



no by F. Babbage.

DAIRY SHORTHORN BULL.



DAIRY SHORTHORN COW.

some years since discontinued, were largely instrumental in extending acquaintance with the Shorthorn, which is kept pure in many excellent herds, more recently renovated by purchases of animals of the best blood in England and Scotland.

After the dispersion of the Ketton and Barmpton herds, the first great sale was that of Mr. Christopher Mason, at Chilton in 1829. The highest prices were, for a cow, Lady Sarah, bought by Captain Barclay, of Ury, near Stonehaven in the north of Scotland, 150 guineas, and for a bull, Monarch 2347, bought by Mr. Latouche, of Harristown, in Ireland, 270 guineas. Sixteen females and the bulls Mercury and Windsor were purchased by Earl Spencer, the Lord Althorp of Berry's account of the Shorthorn in Youatt's work on *Cattle*. The fine herd at Wiseton had been founded some years previously by purchases of first-rate Shorthorns in Northumberland and elsewhere, including selections from Mr. Robert Colling's herd at Barmpton. The Chilton averages were £55 16s. 1d. for 61 cows and heifers, £82 3s. 6d. for 27 bulls and bull calves, and £63 17s. 10d. for each of the 88 animals, making a total of £5,622 15s.

Mr. Bates, born in Northumberland in 1775, early took up agriculture as a practical farmer on his father's estate in the Vale of North Tyne, and in 1800 entered upon the tenancy of Halton Castle farms in the same county with a twenty-one years' lease, and bought stock from Messrs. Colling. In 1811 he bought the Kirklevington estate near Yarm, Yorks, and in 1818 the Ridley Hall estate in South Tynedale, to which he removed on the expiration of his Halton lease in 1821, thence removing with his whole herd to Kirklevington in 1830. He had at that time, it is stated, 50 daughters of his famous bull Second Hubback 1423, all good milkers and "like beans" in their resemblance to one another. Second Hubback united the Duchess tribe of Ketton with the Red Rose tribe of Barmpton. Soon afterwards Mr. Bates was letting bulls for sums varying from 100 to 300 guineas for

the season. Besides the strains mentioned, he had the Old Daisy strain of Mr. Charles Colling through Daisy Bull 186, and in 1831 he bought from Mr. Stephenson, of Wolviston, the bull Belvedere 1706, of Mr. R. Colling's Princess tribe. His six tribes retained to the time of his death were the Duchess, Oxford, Red Rose, Waterloo, Wild Eyes and Foggathorpe. The Oxford tribe, descended from a daughter of Mr. Mason's Matchem, took its name from the winner of the premium as best Shorthorn cow at the first show of the Royal Agricultural Society of England, held at Oxford in 1839. In the following year, when the same Society held its show at Cambridge, a heifer of the Red Rose tribe, Red Rose 13th, was at the head of her class, and was renamed Cambridge Premium Rose. From that time the females of the tribe in Mr. Bates's herd were called Cambridge Roses, and were numbered consecutively, like the other Kirklevington tribes.

The Kirklevington Shorthorns having, by their distinguished honours in the showyard, confirmed the reputation of their breeder, Mr. Bates did not care to exhibit his cattle after the year 1841. He died in July, 1849, and his herd was sold by auction on May 9th, 1850, when 48 cows, heifers, and heifer calves averaged £63 9s. 7d., and 20 bulls and bull calves £75 10s. 11d., making a general average of £67 0s. 7d. for the 68 animals, and a total of £4,558 1s. This was considered a great result after the depressed prices of many preceding years, but it was only the beginning of a rise in value which reached thousands of pounds each for many animals, and averages of hundreds of pounds at many sales.

At the Kirklevington sale the most prominent purchaser was Earl Ducie, whose selections consisted of 3 females and 1 male of the Duchess tribe, at the cost of 660 guineas, and 2 females of the Oxford tribe, costing 250 guineas, altogether amounting to an aggregate outlay of 910 guineas, or £955 10s. Earl Ducie's herd at Tortworth Court, Gloucestershire, previously bred with great care and judgment from

choice old Shorthorn families, thus became one of the most attractive herds in the kingdom, and sold in 1853, after its owner's death (a great loss to the Shorthorn interest), realised an average of £140 2s. 10d. for 49 females, and of £191 18s. 2d. for 13 males, or a general average of £150 19s. 11d. for 62 animals, and a grand total of £9,361 16s. Within the three years and three months between the Kirklevington and Tortworth sales, Earl Ducie's Duchesses had multiplied from 4 to 10 animals, of which 8 females realised 3,060 guineas, and 2 males 1,150 guineas, together 4,210 guineas, leaving a balance of 3,550 guineas in excess of the original cost. The Oxfords had multiplied from 2 to 6, one of which, the bull Fourth Duke of Oxford, calved at Tortworth, had been sold by Earl Ducie to Mr. Sainsbury in Wiltshire. At the sale, 4 female Oxfords realised 835 guineas, and a bull, Fifth Duke of Oxford, 300 guineas, the price paid by Lord Feversham, in whose possession he was the premier bull of the Royal Agricultural Society's Show at Chester in 1858, and became the sire of Skyrocket, the Leeds "Royal" premier bull of 1861. Thus in excess of cost price, the Oxfords at the sale alone made 885 guineas, the Duchesses and Oxfords together 4,435 guineas or £4,656 15s. The price of the bull sold privately, the services of other bulls in the herd, and the greatly enhanced prestige and selling value of the herd from the addition of the Duchesses and Oxfords, not here taken into account, if reckoned as only balancing the cost of keeping the Duchesses and Oxfords, would still leave a net profit of between four and five thousand pounds upon the six animals bought at Kirklevington *for less than one thousand* pounds. The animals of the Duchess tribe were bought by two English breeders, Colonel Gunter and Mr. Tanqueray, and by the American breeders, Messrs. Becar and Morris, Mr. Samuel Thorne, General Cadwallader and Mr. Vail. The Oxfords became the property of the late Duke of Devonshire (at that time Earl of Burlington), Mr. Tanqueray, and, as already stated, the late Lord Feversham. Descendants of

Shorthorns exported to America have returned to England and Scotland at enormously high prices. In 1873 Messrs. Walcott and Campbell's sale at New York Mills realised the highest prices on record for any breed of cattle.

The Booth family, from Mr. Thomas Booth's beginning as a Shorthorn breeder at Killerby before the year 1790 down to the present time, have worked upon the one plan of getting the frame of the animal right according to the generally recognised standard of the grazier, whilst cultivating the dairy properties so far as might be found consistent with the primary object—the growth of abundant flesh. Thus it has often happened that when the muscular development has been kept in check by early and rapid breeding, and the food and general management of the animals have favoured lactescence, cows of Booth blood have proved prodigious milkers. The Booth type, nevertheless, is distinctively that of the beef-making Shorthorn. Mr. Thomas Booth formed the original herd by the purchase of good female stock of the Teeswater breed and the introduction of bulls from the herds of Messrs. Charles and Robert Colling. The best of his home-bred bulls were also used, and the herd was kept partly on his Killerby estate and partly at Warlaby, his other property. He lived at Killerby, and kept the Warlaby farm in his own hands. Afterwards he removed to Warlaby, his elder son, Mr. John Booth, residing at Killerby and taking part of the herd; his younger son, Mr. Richard Booth, having previously (in 1814) gone to Studley with a few animals from the Killerby herd. From those, and from female animals selected elsewhere, with the use of some of the best sires in the original herd and bulls of his own breeding, he bred two or three of the finest cows of the day. The famous Anna, Isabella, and Medora tribes all had their rise at Studley, although the foundation of the Anna tribe was the Bright Eyes tribe of the original Killerby herd. Those two superlatively good, grand cows, Anna and Isabella, however, abundantly repaid to Killerby the debt that Studley

owed. Anna's son, Argus, and Isabella's son, Isaac, used at Killerby, imparted fresh energy to the old stock; and the subsequent glory of the Killerby herd came from the union of the cow Toy, a daughter of Argus, and the bull Priam, a son of Isaac, the result being the birth of the twin heifers, Necklace and Bracelet, which, inheriting the extreme excellence of Isabella and Anna, were commonly regarded as two of the best cows that England had produced.

Bracelet's influence, through the interbreeding of her descendants, is believed to be still very powerful in many herds. It was transmitted most largely through her son Buckingham 3239, bred by Mr. John Booth at Killerby and sold to his brother, Mr. Richard Booth, at Warlaby, where in the course of a few years every animal in the herd had Buckingham's blood by a plurality of descents from him. As the number of descents multiplied rapidly, and continues to multiply, in herds of the Booth blood, the reproduction of cows inheriting much of Bracelet's character may be prolonged indefinitely. Buckingham was a son of Colonel Cradock's Mussulman, of the Old Cherry tribe of his herd at Hartforth. The intermixing of the progeny of Buckingham and Leonard 4210, a bull bred at Warlaby from the old Strawberry and Halnaby tribe of Mr. Thomas Booth, crossed with Mr. Raine's Lord Lieutenant, was Mr. Richard Booth's great masterstroke of fortunate skill, leading to his immense success as an exhibitor.

Sir Charles Knightley was another breeder who, like Messrs. Booth and Mr. Bates, succeeded in impressing upon his herd his own particular taste. Curiously enough, in the early years of his breeding he had stock from Killerby, and towards the close a bull whose parents were bred at Kirklevington; but the distinctive sub-type of Sir Charles Knightley's herd at Fawsley Park in Northamptonshire differed widely, and perhaps equally, from both the Booth and the Bates sub-type. His cattle were very neat and uniform, with nice heads and well-laid shoulders, and were of medium size, mostly not so

large as either Bates or Booth Shorthorns. At the sale in 1856 the almost entire herd (only a few of the least saleable animals being retained) made an average of more than £80 each for 77 animals, male and female, of all ages. At that sale two beautiful cows were purchased for the Prince Consort at the cost of 100 guineas each. The Windsor herd, under able management, and frequently under His Royal Highness's own inspection, was noted for the sterling worth of the animals composing it, and afforded an example of the sound system of breeding from animals assorted according to personal fitness, with due regard also to pedigree, but little notice of passing fashions. Some Warlaby sires were hired and left excellent stock. Descendants of cows bred at Windsor from the blending of the Warlaby and Fawsley strains had been long remarkable for their excellence in the herd bred by King Edward on the Wolferton Farm at Sandringham. The Windsor herd has been maintained in great excellence, and the King's Shorthorns have constantly gained high honours, repeatedly the highest, at the leading shows. At the Birmingham and Smithfield Club fat stock shows of 1895 the late Queen Victoria's heifer Frederica, previously a first prize-winner of the Royal Agricultural Society of England, gained not only the first prizes in her class, but also the breed, sex, and champion honours. Latterly, the maintenance of the high character of the Windsor herd has been due to the introduction of some of the best Scotch Shorthorns. Lord Lovat's New Year's Gift 57796, purchased for her Majesty, was sold for 1,000 guineas at the sale of a portion of the Windsor herd in March, 1892. The Royal herd has maintained its high reputation in the possession of King George V.

The history of Shorthorn breeding in Scotland, and of the enormous beef production and trade arising from it, would fill a volume. General Simson, of Pitcorthie; Mr. Robertson, of Ladykirk; and Mr. Rennie, of Phantasie, led the way, introducing the Colling blood, and were followed by Captain

Barclay, of Ury. Mr. Grant Duff, of Eden; Messrs. A. and A. Cruickshank, of Sittyton; Mr. Hay and Mr. Shepherd, of Shethin; and Messrs. Marr, of Uppermill; Campbell, of Kinellar; and Duthie, of Collynie, came to the front in subsequent years, and were among the foremost in fixing the more distinctively Scotch type of Shorthorn. Mr. Amos Cruickshank's great services to the breed have been widely recognized in all parts of the world. A fine herd of Kirklevington blood was established by the Earl of Dunmore at Dunmore, and one of Killerby and Warlaby strains by Messrs. J. W. and E. Cruickshank at Lethenty. Lord Polwarth's herd, at Mertoun (of Booth blood), had a long and brilliant history. Of late years Scotch Shorthorns have won very extensively at the principal shows, and the blood has been freely infused into leading English herds as well as in those in other countries.

In Ireland, parallel history, from the date of the English Chilton sale to this time, gives us many prominent names, such as those of Messrs. Latouche, Fox, Holmes, Barnes, Chaloner, Welsted, Talbot-Crosbie, Bolton, Meadows, Downing and Maxwell-Gumbleton, Lord Rathdonnell and Mr. Humphry Smith. The Colling, Booth, Mason strains of blood were most in favour, and Shorthorns of the highest excellence have been bred in Ireland. The Scotch blood has also been successfully introduced.

Returning to English Shorthorn history, we have a notable event in the sale of the first herd of Colonel Towneley, of Towneley, Lancashire, March 17th, 1864. Exclusive of the reserve of £1,200 at which the prize bull, Royal Butterfly, was withdrawn, the averages were:—£123 19s. 4d. for 46 females, £148 13s. 7d. for 10 males, and £128 7s. 7d. for the herd of 56 animals, the aggregate being £7,189 7s. The prestige of the Towneley herd was gained and maintained chiefly in a series of brilliant successes, extending over many years, at the national and local shows. The descendants of a

remarkable cow, Mr. Waldy's Barmpton Rose, especially those of the "Butterfly" group, and of cows bred by Mr. John Booth at Killerby, were animals of distinguished merit in the Towneley herd, whilst much of the success was due also to the influences of two impressive sires: first, Mr. John Booth's Jeweller, a closely in-bred grandson of both Necklace and Bracelet, and of Mr. R. Booth's Leonard also; and secondly, Frederick, a home-bred bull, uniting the families of Barmpton Rose and Colonel Cradock's Old Cherry. The herd, however, was bred and exhibited with consummate ability under the sound judgment of Colonel Towneley's agent, Mr. Eastwood, and the unsurpassed skill of Mr. Joseph Culshaw as resident manager. Successful breeding and exhibiting were repeated at Towneley for some years after the first sale, but the first herd bore the strongest mark of distinct character.

In the year 1865 a celebrated sale took place in Willis's Rooms, London, although the small herd sold remained in Cheshire until claimed by the purchasers. It was that of the Grand Duchess family, consisting of 12 cows and heifers, several bulls of the same family, and an Oxford bull. The Grand Duchesses had been bred by Mr. S. E. Bolden in Lancashire, from Duchess 51st, bought at the Kirklevington sale, and Grand Duke, likewise bred at Kirklevington. Then some Booth blood was introduced by Mr. Bolden, and some of the offspring were crossed back again to the Bates blood. The family was purchased by Mr. Hegan, who, dying shortly afterwards, left the herd for public sale. The bulls realised very high prices, and went into some of the chief herds, but the interest of the sale was centred upon the bidding for the Grand Duchesses, which were divided into lots of three each, and were all bought by Mr. E. L. Betts, of Preston Hall, Kent, for £6,510, making an average of £542 10s., the highest ever reached up to that time.

In the year 1871 five sales ranged in average price from a little over £100 to more than £240, the Duke of Devonshire's being the highest. In 1873 and 1874, Mr.

E. H. Cheney's sales were first—£294 10s. and over £419 —and in the latter year the Duke of Devonshire's and the Earl of Bective's were respectively over £383 and £363 averages. In 1875 a selection of 39 animals from the herd of the Earl of Dunmore, in Scotland, averaged £672 8s., two bulls realizing respectively 3,000 and 4,500 guineas, and the entire herd of Mr. W. Torr, of Aylesby (deceased), numbering 84 animals, was dispersed at an average of £510 19s. Twelve of the females of Mr. Richard Booth's Anna tribe were bought by his nephew, the late Mr. T. C. Booth, of Warlaby, at an average of more than £1,000 each. In the same year Mr. George Moore's herd at Whitehall, in Cumberland, was sold at an average above £309, the females averaging over £380. In 1877, Mr. Cheney's 25 exceeded £533 average, and 43 imported from Canada by the Hon. M. H. Cochrane and Mr. Simon Beattie, and sold near Bowness, on Windermere Lake, averaged above £398.

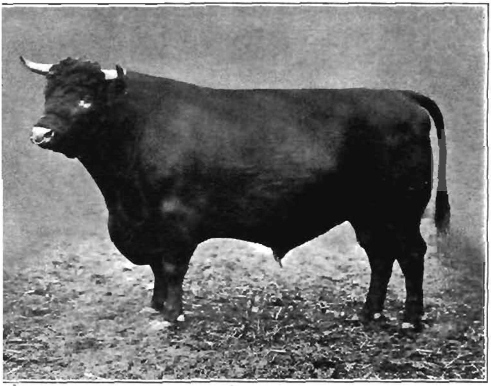
Prices, however, were raised to an unsafe height by a feverish fancy, and by speculation. Reaction followed, and for several years low prices prevailed, with occasional indications of the vitality of the Shorthorn interest in an upward tendency for really good cattle. Within the last few years that tendency has been more steadily manifest. There has been a strong home trade, and a large and increasing demand from South America.

The dual properties of the breed have always been a strong feature, the combination of beef and milk having been very marked. As the export demand was mainly for beef production the milking qualities were, in some cases, neglected, but recently there has been a great revival of the interest in milking production. The Dairy Shorthorn (Coates' Herd Book) Association was formed, and has offered prizes for dairy shorthorns at the leading shows. The display of dairy shorthorns at the meetings of the Royal Agricultural Society and other exhibitions has been large in numbers and of high merit.

Since this breed overspread the world, Shorthorn literature has abounded. The Rev. Henry Berry was its first historian after Culley. In 1867 Mr. William Carr, and in 1871 Mr. Thomas Bell, issued respectively books on the Booth and the Bates herds. Early numbers of Thornton's "Circular and Record of Shorthorn Transactions," comprised able accounts of famous breeders. The late Mr. Thornton founded the large business, latterly transferred to the firm of Messrs. John Thornton & Co., and the Shorthorn circular continues to be issued quarterly. Of past years there are the writings of Mr. Henry Hall Dixon ("The Druid"), the Rev. John Storer ("Historicus"), Rev. George Gilbert, Rev. W. Holt Beever, and Mr. Robert Fletcher Housman. A complete "History of Shorthorns," edited by Mr. James Sinclair, is published by Messrs. Vinton & Co., London. In the United States Mr. Alvin H. Sanders has described the Story of the Shorthorns.

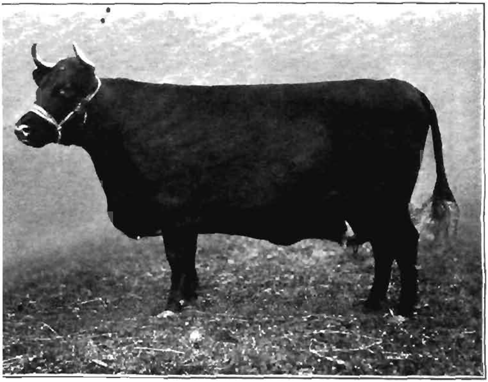
THE LINCOLNSHIRE RED SHORTHORN.

A few Shorthorns of the Lincolnshire breed, founded upon what is known as "The Turnell improvement," were many years ago admitted into "Coates' Herd Book." A society, however, was formed in 1895 to maintain the excellence and purity of the Lincolnshire Red Shorthorn breed as now established by long-continued selection and occasional introductions of blood from the Shorthorn of Durham and Yorkshire, and many volumes of a separate herd-book for the registration of herds of that breed are now in the hands of members. The principal district of the breeding herds is comprised within an area bounded by an imaginary semicircular line drawn from Great Grimsby, north of Brigg (Ganford-Brigg) to Kirton in Lindsey, thence to Lincoln, on to Sleaford, round to Boston, and straight to the coast. Some good herds lie outside this line, but the chief part of the



[Ph]oto by F. Babbage.

LINCOLNSHIRE RED SHORTHORN BULL.



LINCOLNSHIRE RED SHORTHORN COW.

breeding-ground lies within it, and many excellent herds cluster around Louth. The principal objects which the breeders keep in view in their selections are individual merit, in connection with long descent from known good stocks; and merit, according to the Lincolnshire criterion, comprises large frames, ample length of carcase with abundant substance, high quality of flesh, with plenty of lean to a fair proportion of fat, good dairy properties, hardy constitution and readiness to fatten. The continuity of some herds may be traced over a hundred years; other herds of later origin were founded upon selections from the best old stocks in the county. Most of the heavy bullocks fed upon the grass lands in the fens and marshes of Lincolnshire are of this breed, which is extending its influence into other counties.

In the *Journal of the Royal Agricultural Society of England* for 1888, Second Series, Part 2, the distinguishing characteristics of the breed are described by Mr. Frederick J. Cooke, of Flitcham Abbey, Norfolk. In his report upon the farm prize competition for the counties of Lincoln and Notts, Mr. Cooke says:—"The prevailing breed of cattle is the Shorthorn, although the term is perhaps a little too general to describe them with accuracy and justice. There is no doubt that many of them still retain, in some degree, the distinctive points of the 'Old Lincolnshire Ox.' The constant use of pure-bred bulls [by "pure-bred" he evidently means the registered Durham-Yorkshire Shorthorn] upon cows with some of this blood about them has at last developed the celebrated modern animal which has for so many years been shown in great perfection at the large fairs of the county, whence they have been eagerly bought and widely distributed. The best cattle of to-day are of the rich red colour which has been prized and preserved for so many generations. They are both deep and wide of frame, have for the most part down-pitched horns, and develop into great size and weight if allowed time to do so. But perhaps they are most of all remarkable for the fleshiness of carcase which the

butcher is sure to find with them, a matter of increasing importance in catering for modern tastes."

Classes for the breed have been given for years at the Royal Shows, and they are always well filled.

HEREFORD.

In the year 1788, William Marshall, of the Pickering district in the North Riding of Yorkshire, an accredited judge of English live stock and an eminent authority upon rural economy, declared his belief that the Hereford, taken all in all, might be safely deemed the first breed of cattle in this island. This was very high testimony from a man of his competency as a witness, for he was a practical agriculturist, familiar with all the principal breeds, not by their reputation alone, but also by his own acquaintance with them in their various districts. At the time when he wrote the Longhorn was in its glory: Robert Bakewell had seven years more to live; the Rollright herd was undispersed, and the Croxall herd had a remaining brilliant future of twenty-three years before its distribution. The Devon then was an ancient and a well-known breed, of which Bakewell himself had said that it was so good as to be incapable of improvement by a cross of any other breed; the Davy family had been long distinguished as Devon breeders, and the second James Quartly, of Great Champson, had for twelve years employed his time in raising the herd which his son Francis afterwards made the foremost of the breed in the kingdom. The Shorthorn was rising rapidly; the Aislabies, the Blacketts, the Dobinsons and others possessed old Shorthorn herds of wide local reputation in the near neighbourhood of Marshall's home, and the Collings were already in the field as breeders; whilst the Vale of Pickering itself was noted for its excellent cattle, classed by Marshall with the Sussex and the Hereford as similar in merit in the essentials of large grazing stock—the Hereford, in Marshall's opinion, standing first. Forty-two

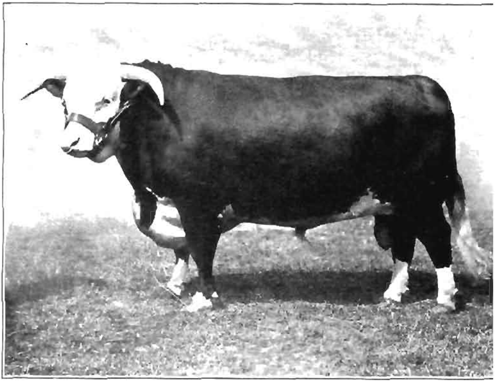


Photo by E. Babbage.

HEREFORD BULL.

HEREFORD COW.

years after Marshall thus commended the breed, William Cobbett ("Rural Rides," 1830) described the white-faced Herefords with dark bodies as "certainly the finest and most beautiful of all horn cattle."

The Hereford is not generally accounted a dairy breed, although occasionally a good dairy cow may be found in a pure-bred family, and half-bred Hereford cows, whatever the other side of the cross may be, are often good milkers. The capabilities of the breed in this respect, however, are perhaps commonly under-estimated, for the breeders, usually paying attention chiefly to the production of beef, have seldom either cultivated or tested them. Those few breeders who, by breeding from the best milkers, special feeding for milk, frequent and clean hand-milking, and other means of increasing the yield, have sought to develop in that direction the latent power, have succeeded in making their Hereford cows profitable dairy cattle. It is as a beef-making breed, nevertheless, that the Hereford stands famous before the world.

Marshall's description of Hereford grazing oxen in Gloucestershire, quoted at length in Messrs. Macdonald and Sinclair's "History of Hereford Cattle," has repeatedly served as a standard of the breed. Subject to modification to make it applicable to the ideal Hereford of the present day, it is still serviceable. The principal features of the breed at that time are carefully indicated. It particularly mentions the general look of health and vigour; the small head with clean chops and pleasant, cheerful, open countenance, broad forehead, full and lively eye; the bright, tapering, and spreading horns, and the long and tapering neck. This last part of the description, relative to the neck, scarcely seems to convey an accurate idea of the Hereford of the present day. The neck, measured from shoulder to head, is certainly in due proportion to the length of middle and of hind quarters: it does not look at all exceedingly long in comparison with the neck in other breeds; but rather on the contrary, at

least in the full-fed Hereford, owing to the prominence of the breast and to the thick packing of flesh forward on the sides of the neck, nearly to the head, and the depth from the back of the crown-ridge to the throat, under the root of the tongue, has a somewhat shortish appearance. The "tapering" of the neck, as described, also suggests a lighter kind of neck than the present Hereford often has. One peculiarity which now characterises the Hereford *generally*, and may be seen in old portraits also, but is not noticed by Marshall, is the comparatively horizontal carriage of the head, less "bridling" than in some other breeds. Marshall goes on to describe a deep chest, broad and projecting bosom, and "shoulder-bone thin, flat, no way protuberant in bone, but full and mellow in flesh." Marshall's exact words are here repeated because their meaning does not seem very clear. If the "shoulder-bone" here is intended to mean the shoulder-blade (scapula), that bone having always a ridge of bone extending lengthwise nearly from top to bottom upon its otherwise flat face, can never be what Marshall requires; but the *flesh* may be so distributed upon either side of the ridge as to give an even surface. When the muscle is so deposited as to rise with the ridge of bone, the effect is what is termed a big out-shoulder. The lower shoulder-bone (the humerus), joined at its upper end to the scapula, and at its lower end to the principal arm-bone, is not a flat bone; but possibly Marshall may have been thinking of the joint of the shoulder-blade and lower shoulder-bone, forming a prominence called the shoulder-point, and may have meant that the flesh should conceal the prominence of that joint. Proceeding with his description, which has the credit of long acceptance by breeders and judges of Herefords, we read that the chine is full (big, wide crops, understood—emphatically true of the Hereford to-day), the loin broad, hips wide, and level with the spine; quarters long, and wide at the "nache" (an old-fashioned term apparently having the same meaning as the "catch," or

end of the quarter), the end even with the general level of the back, not drooping, nor standing high and sharp above the quarters; the tail slender and neatly haired. Here it is perhaps necessary to add to Marshall's description the remark that in many of the finest specimens of the breed we see the tail ending in a very large and handsome bush of white hair, sometimes springing from a considerable height, quite as high as the twist, and nearly touching the ground. Marshall describes the barrel as round and roomy, smooth and even; the carcase thoughout deep and well spread; ribs broad, close, flat outwardly, "the hindmost large and of full length; the round-bone small, snug, not prominent." His note on the thigh needs alteration to make it suit the highly-bred Hereford of to-day, as originally it suited the Gloucestershire grazing Hereford bullock of the end of last century. The exact words are—"the thigh clean and regularly tapering." A marked characteristic of the mature Hereford now, in full flesh, is roundness of the thigh. The shortness and straightness (or "uprightness" as he calls it) of the legs, and the fineness of bone below the knees and the hocks, and the fulness of the twist and appurtenances, the middle size of the feet, the large flank, and the mellowness of the pleasantly yielding flesh, are as truly characteristic now as they were a hundred years ago. In assenting, however, to the term "soft," which is also used in connection with "mellow," we must remember that whilst this applies to the grazing or half-fat bullock, under favourable feeding the animal becomes eventually "hard fat," so that the same flesh which, when the animal was in merely "fresh" condition, varied from softness to firm elasticity, may acquire that extra firmness which the butcher well understands and appreciates. This condition may be modified to please the touch with a softer sensation. Good oilcake freely used, and other food producing the softer fat, will do it; but the thoroughly fatted animal, in perfection, is of substance too solid to yield easily under the hand. Our authority observes

that the handling as described by him is especially pleasant on the chine, shoulders and ribs; that the hide is mellow, supple, of medium thickness, and loose on the "nache" and huckle. The term "nache" is this time used in a connection that leaves little doubt of its meaning. The huckle, unquestionably, is the hip, and the coverings of the hip-bones, and of the bones ending the quarter, are recognised test-points of quality. The hair and colour are thus described: "the coat neatly haired, bright and silky; its colour a middle red, with a bald face, the last being esteemed characteristic of the true Herefordshire breed."

A description quoted by Marshall's contemporary, Culley, in the words of Mr. Ellman, as that of the "Herefordshire or Sussex Cattle," may be dismissed as evidently confusing the two breeds. John Lawrence, in his "General Treatise on Cattle," at the beginning of the present century, mentioned the Hereford's white face, which also appears in all the drawings illustrating George Garrard's earlier work. Lawrence, although he did not go with Marshall so far as to place the Hereford first of all breeds in the island, considered it for some purposes the best breed in the world, pre-eminently distinguished for the produce of beef, quick feeding in proportion to growth and size, and combined strength and speed for labour. He contended that no English breed could compete with it in profitable return of quantity of beef, whilst top market prices always attested the quality. Both Garrard on "Oxen Common in the British Islands," dated 1800, and the Rev. W. Bingley, who wrote on "British Quadrupeds," 1809, have described the Hereford as light in the fore-end. The former considers such lightness "one of the marks of true beauty," and associates it with depth and breadth of form generally; the latter still more curiously couples it with breadth and depth of bosom. Other writers of about the same period frequently refer to the white face and white under the bodies and on the legs and shoulders. Some refer to the mottle-faced Herefords, and occasionally we meet with men-

tion of the greys. These were of two classes, the light and the dark, and occasionally two greys paired would breed white offspring. The dark grey was sometimes scarcely distinguishable from a red, but broken to a grizzle at the edges of the red, with a few white hairs scattered in the red. It was "grey" only in technical language. The light grey varied from a reddish fleck to a thin grey roan. Grey Herefords, both dark and light, had white faces, feet, and other markings like the red variety, and sometimes, as in the red, the face was more or less spotted. All these varieties of colour still are, or have been recently, reproduced, although fashion has long made white-faced red the general colour and marking of the breed. The most noted greys in the latter part of the last century were those of Mr. Tully, from whom Mr. T. A. Knight, of Downton Castle, had the sort, famous afterwards as "Knight's Greys."

Various traditions concerning the origin of the Hereford are in existence. Before the days of railways, half-penny postage and abundant live-stock literature, traces of all the sources of a new compound breed were seldom, if ever, preserved until that breed obtained general recognition. The county of Hereford produced good grazing cattle long before the white-faced breed became the recognised breed of the county, but special improvement, and the establishment of a distinct type, appear to have concurred with the introduction of the white face, sometimes spotted or mottled. Record and tradition give various accounts of the origin of this peculiarity of colour and marking. There is the story of the white-faced red bull with rather wide horns, brought from Yorkshire by Mr. Galliers some time about the middle of last century. It appears to be quite a genuine record, but does not mention where the bull was bred, nor whether he had been in the hands of a Yorkshire breeder. He may have come from an east Yorkshire sea-port, on his arrival from the other side of sea. We do not learn that a white-faced breed existed in Yorkshire at that time. The natural inference, therefore, is

that Mr. Galliers' bull either had his white face from what is termed a "sport" in breeding, or was a purchased specimen of a white-faced breed then in existence elsewhere.

Then there is the record, apparently well authenticated, that Lord Scudamore introduced cattle from Flanders; and Mr. Thomas Andrew Knight, whose opinion commands respect, ascribed to this Flemish cross the origin of the superiority of the Hereford cattle. The exact date of importation is not stated. Lord Scudamore died in 1671, so it might be a few years before or after the middle of the century—say, roundly, 250 years ago. The frequency of white-faced cattle in Cuyp's pictures of about the same time (Cuyp, born in 1606, is supposed to have lived to advanced age) has been mentioned as proving the existence of such cattle in Flanders, and probably in large numbers, at the time of the Scudamore importation. The white face, however, both clear and mottled, was found in other parts of England besides Herefordshire in the last century, and is at the present time a characteristic of more than one continental breed.

Among the earliest Hereford herds of which records are extant were those of Messrs. Haywood of Clifton-on-Teme, Galliers of Wigmore Grange (whose son continued the breeding of Herefords at Frogdon and Lynch Court), Tully of Huntington, Tully of Haywood and Tully of Clyro, Skyrme of Stretton, and the Tomkins family, formerly considerable landowners about Weobley, subsequently farming in the townships of Canon Pyon and Kings Pyon. Mr. Richard Tomkins of Garnstone; who died in 1723, is supposed to have possessed superior cattle, but the supposition rests mainly upon the fact that in his will he mentioned certain animals by name, as if they were better than ordinary farm-stock. He bequeathed these to his son Benjamin, of Court House, Canon Pyon, a very enterprising breeder, a contemporary and friend of Mr. William Galliers of Wigmore Grange, with whom he exchanged animals, so the two had between them virtually one large herd, in the composition of which were

materials selected by them, it is said, in different parts of England. Possibly these later ingatherings of picked cattle from various districts, immediately before the systematic improvement of the breed began, may have done quite as much as the Flemish cross introduced a century earlier to form the character of the modern Hereford. This Benjamin Tomkins, born in 1714, died in 1789 (see "History of Hereford Cattle," pp. 38, 39, family pedigree), at Wellington Court, whither he had removed in 1758. His second son, also named Benjamin, was the man whose name now occupies the leading place on the list of pioneer breeders, not for chronological priority, because his father, and his father's contemporaries, if not some of their predecessors, must be recognised as contributors to the development and progress of the rising breed. His fame exceeds that of preceding breeders inasmuch as he did more than they towards the favourable introduction of the Hereford to public notice, and so became associated more closely with its establishment as a leading breed. For that reason he has been inaccurately described as its founder. He was born in 1745, began business as a farmer in early life at Blackhall, Kings Pyon, on his father's death took also the Wellington Court Farm, to which he removed from Blackhall in 1798, remaining at Wellington Court until about three years before his death, which took place at Brook House, Kings Pyon, in 1815. The time of his beginning to breed Herefords on his own account, after having been trained as a breeder on his father's farm, is variously stated as 1766, 1769 and 1772. If we take the last of those years and reckon his work from it to the year 1812, when he retired from Wellington Court to Brook House, we have him for forty years a breeder; if the middle date, forty-three years; and if the earliest date, forty-six years; and if he continued to take an active part subsequently in the breeding of the herd which was eventually sold at Brook House in 1819, four years after his death, the length of his life's work from the earliest year mentioned, to his death in 1815, was forty-nine years. His

two foundation cows, it is said—one named Mottle, dark-red with spotted face, the other named Pigeon, grey—were purchased, one account says, from a village wheelwright; another, that they were bought at Kington fair. He had also a noted cow named Silver, whether from another source, or descended from Mottle or Pigeon, does not appear, but as his herd when it had risen into notice was composed of the Mottle, Silver, and Pigeon tribes, a separate origin of the Silver tribe seems probable. The three varieties of colour and marking were represented in his herd, mottle-faced, white-faced red, and grey. Little is positively known of the earliest bulls used by Mr. Benjamin Tomkins. Messrs. Macdonald and Sinclair suggest that "the bull with which he began probably came from the herd of the elder Benjamin Tomkins, and the subsequent infusions of fresh blood which he evidently introduced would very likely also have been from his father's stock and some of the other old herds which have been mentioned"—referring, no doubt, to those of his father's friend, Mr. William Galliers, the Haywoods, the Tullys and their contemporaries. In later years he is said to have bred exclusively from his own stock, and it is evident that he did not scruple to breed from closely related animals. For example, his famous "Slit Teat Cow" bred to her sister's son the cow known as Price's No. 23, sold at the Ryall sale in 1816 for £110 5s. The sister to "Slit Teat Cow," Price's No. 25, was herself sold at the same sale, at the age of twenty years, for £32 11s. Mr. John Price, of Ryall, had bought from Mr. B. Tomkins a considerable number of cows, including the two here named according to their horn-marks at Ryall, but respectively lots 64 and 66 in the celebrated sale of Mr. Price's stock. The bull Wellington 4, bred by Mr. Tomkins, had been also purchased by Mr. Price, and at the age of eight years realised at his sale the sum of 270 guineas. It was said that Mr. Tomkins considered him the best bull and best sire he ever had, excepting Silver Bull 41, the sire of the "Slit Teat Cow," which in a note to the pedigree of

the bull Titheman 6 in the Herd Book entry, as also in the Ryall Sale Catalogue, is described as in Mr. Tomkins' opinion the best cow he ever had. With this statement, however, we may compare a note to the Herd Book entry of Proctor's Bull 316, which states that Old Pink was Mr. Tomkins' favourite cow. Mr. Price's boast was that he had bought up Mr. Tomkins' best animals; yet there was one cow he never could tempt him to sell, although he offered him £250 for her. The cattle left to his daughter, Miss Tomkins, and sold by auction in 1819 (four years after his death) realised £4,673 14s., the 52 animals, comprising cows, heifers, bulls and young calves, averaging £89 17s. 6d. The highest price was 560 guineas, paid by Lord Talbot for the two-year-old mottle-faced bull Phœnix 55, son of Wild Bull 145, whose sire was Silver Bull 41. "Mr. Tomkins," a note in the appendix to the first volume of the Herd Book states, "once drove twenty of his cows to Hereford on the day of the agricultural show, and offered 100 guineas to any one who would show an equal number superior to them. The offer, however, was not accepted."

Mr. Price, whose success as a breeder, chronologically following hard upon that of Mr. Tomkins, was scarcely less brilliant than his great predecessor's, maintained for the Hereford, by the excellence of his herd, the prestige which through the judgment and energy of Mr. Tomkins the breed had gained. He, too, sent forth a challenge, differing in terms and circumstances from that of Mr. Tomkins at the Hereford show. In the year 1839 he offered "to show twenty cows and a bull of his own breeding against the same number of any one person's breeding, and of any breed—open to all England;" and he allowed one month for acceptance. This raised a correspondence with the great Shorthorn breeder, Mr. Thomas Bates, of Kirklevington, but the proposed competition never took place. Mr. Price had several very successful sales of his cattle, and both by public auction and in private transactions sold animals for very large

sums of money. His 69 bulls registered in the first volume of the Herd Book have the second place in number, the largest number of entries of the bulls of any one breeder in that volume being Mr. John Hewer's 90. Mr. Price is said to have improved upon the Tomkins type by modifying the great width across the hips and considerably increasing the width over the crops. He had white-faced, mottle-faced, and grey cattle, some of the latter of a singularly beautiful colour, smoky-grey, or roan.

The name of Hewer occupies a very prominent place in Hereford history. Mr. John Hewer, who died so recently as the year 1873, having entered his 87th year, had been reared among the Herefords. When he was about ten years of age, his father had a favourite Hereford bull of the white-faced variety, named Silver 540. From that bull the herd of his father, Mr. William Hewer, formerly of Northleach, Gloucestershire, afterwards of Hardwick, Abergavenny, traced descent; and Mr. John Hewer's own herd was bred from his father's stock. Possibly early and pleasant recollections of Silver and his white-faced descendants influenced the boy's taste and gave that strong partiality to the white-faced red Hereford which made Mr. John Hewer a leader of the fashion that eventually effected the conformity of the breed in general to the colour and markings of that variety, and put aside the mottle-faced and grey varieties. Mr. John Hewer, although he was not the first Hereford breeder who adopted the practice of letting bulls, was the one who in his day most extensively made use of it. His son, Mr. J. L. Hewer, stated to Messrs. Macdonald and Sinclair (see "History of Hereford Cattle") that as many as 35 bulls were out on hire at one time. His famous bull Soverign 404, calved in 1820, besides being used by his father, Mr. W. Hewer, and in his own herd, was let to many of the prominent breeders of the day, including Sir Hungerford Hoskyns, Bart., whose fine old herd is strongly represented in that of Mr. John Hungerford Arkwright, of Hampton Court, the breeder of a large number

of prize-winners. Lord Sherbourne, the Hon. H. Morton, and Messrs. Jeffries (of the Grove and Cotmore), R. Yeomans and J. Turner, were also among the breeders who used Sovereign, whose various lettings realised the aggregate of £640 18s. (See *H.H.B.*, No. 404). When the Royal Agricultural Society of England held its first show, in 1839, at Oxford, the "Sovereign blood" was in the Hereford ranks what the "Belvedere blood" was in those of Shorthorns, and the name of Hewer parallel with that of Bates. The first prize bull, Cotmore 376, bred and exhibited by Mr. T. Jeffries, was a son of Sovereign; the first prize cow, Spot, bred by Mr. John Turner of The Noke, exhibited by Mr. Walker of Northleach, was by a son of Sovereign. Mr. John Hewer's heifer Lady Oxford was adjudged the best in her class; and in the next following year at Cambridge, Sir Hungerford Hoskyns' cow, Fatrumps, the winner, was also one of Sovereign's stock, and Mr. J. Hewer's Duchess of Cambridge was the best heifer.

The following breeders, besides those already mentioned in connection with Oxford and Cambridge, were exhibitors of first prize winners bred by themselves and shown in either the class of oldest bulls or that of cows within the first twenty of the Society's shows—1839 to 1858 inclusive:—P. Morris, Newbury; Earl Talbot; John Yeomans, Moreton; W. Perry, Monkland and Cholstrey; T. Sheriff, Coxall; J. N. Carpenter, Eardisland; (at Newcastle, 1846, the first prize bull, The Duke 493, although not exhibited by his breeder E. Gough, who had died, had not passed out of the family nor left his birth-place, Gravel Hill); C. Walker, Sutton; S. Aston, Lynch Court; J. Monkhouse, The Stow; Lord Berwick, Cronkhill; E. Price, Court House; P. Turner, The Leen; and Edward Williams, of Llowes Court, Leominster. Some of these breeders were repeatedly successful, and they and others were also breeders of animals winning in new ownership. Two, indeed, of the most celebrated bulls of their day were Sir David 349, bred by Mr.

David Williams of Newton, Brecon, and first winner at Norwich, 1849, in the hands of Mr. E. Price, Court House, and Walford 871, *bred by Mr. Thos. Longmore and exhibited by* Lord Berwick, in whose possession he won at Windsor in 1851.

The influence of Sir David as a sire proved to be one of those extraordinary powers which in the histories of breeds occasionally rise up, far beyond the expectations of the breeders from whose herds they come forth. Sir David's sire, which also was his dam's sire, was the bull Chance 348, bred by Mr. John Turner, of The Noke, and named in reference to the accidental circumstances of his existence, whilst the maternal granddam of Sir David was a cow without registered pedigree. The sire of Chance was one (no one ever knew which) of a lot of young bulls, some of which were sons of Mr. John Hewer's Lottery 410; the dam of Chance was a daughter of Lottery 410, and out of a daughter of Mr. John Hewer's Sovereign 404. For this extension compare the English entry 348 with the entry 119 in the American Hereford Record. Sir David, therefore, was largely indebted to the Hewer blood. Perhaps the most distinguished of his sons was Mr. Benjamin Rogers's Sir Benjamin 1387; but Mr. Edward Price's Pembridge 721 (an ancestor of Horace 3877), also inherited Sir David's marvellous impressive power, which in various degrees was transmitted through other channels besides. It is not possible here to enumerate the illustrious descendants of Sir David. The prize lists of the leading agricultural societies are full of them.

Walford, as already said, became Lord Berwick's property. The herd of Lord Berwick was founded upon stock purchased at the dispersion of that of Mr. Theophilus Salwey, of Ashley Moor, bred from stock which Mr. Salwey had from his friend and neighbour Mr. Thomas Andrew Knight, of Downton Castle, Ludlow, descended from the Tully, Skyrme, and Tomkins herds. Mr. Knight had exercised his exceptionally strong judgment in developing, from a combination of the three distinct strains of blood in those herds, a very beau-

tiful sub-type, conformed to his own ideal. His cattle were models of symmetry and compactness, light in the bone, with straight, short, well set legs, which they used with remarkably good action. It was one of his great points to have them all good steppers, agile, active, and vigorous. The character of his cattle was fully maintained in their descendents at Ashley Moor, under the control of his able disciple Mr. Salwey. Lord Berwick, who personally and most successfully directed the breeding of his own herd, was quick to recognise the beauty and real usefulness of the Salwey-Knight Herefords; and whilst adding fresh blood, such as that of Walford, when necessary, constantly bred to the distinctive character of the original stock. Some of the animals were grey, a colour to which Lord Berwick was particularly partial; but as the fashion for red with white face overspread the Hereford breeding district the Cronkhill Herefords gradually took the colour and markings prescribed by the popular taste. Thick-fleshed animals, and fully and evenly made up in all the flesh-points, although not apparently so large as some other Herefords, they were very massive and made prime beef, in live weight comparing favourably with many animals of more roomy frame, and incomparably better than those of bigger bone in the proportionate weight of dressed carcase to offal. Their heads had the fine character which is a recognised token of high breeding. Thus described in the past tense, the Cronkhill type still exists in representative descendants of the Cronkhill Herefords.

The name of Turner, already mentioned, has been closely associated with Hereford history from the year 1780, when Mr. James Turner founded his herd at Aymestry. Mr. John Turner, of The Noke, and Mr. Philip Turner, of The Leen, followed, with distinguished success. The latter, after transferring a part of his herd to his son Mr. A. P. Turner, retired from breeding in the year 1883, when the remaining larger part, comprising 117 animals, male and female, of all ages, was sold at the great average of £76 each.

A remarkable instance of the success of sound and independent judgment exercised with persevering self-confidence is afforded in the life of the late Mr. William Tudge, of Ashford, and subsequently of Adforton. Mr. Tudge had the advantage of a will strong enough to resist at once the detractions of prejudice and the temptation to be led by fashion to a falsely high estimate of the worth of animals. Having also in his own mind a very clear conception of what a Hereford should be, he selected his original stock, and from time to time added to it, with a definite aim in view, from which no considerations of the immediate approval or disapproval of other breeders were allowed to divert his attention. The result was a herd of extraordinary and uniform excellence, proved with males and females alike in many showyards, and eventually recognised by the world's Hereford breeders. He began breeding in 1832 with a few choice heifers and a bull from the thoroughly good herd of his uncle, Mr. Weyman of Stocktonbury. The bull Turpin 300, a 100 guineas purchase from Mr. Eyton, the original editor of the Hereford Herd Book, but bred by Mr. J. Morris of Stocktonbury, left some grand heifers, which formed the basis of his great success as a breeder. He used many bulls of his own breeding, and had the Sir David, Sir Benjamin and Sir Thomas brand from Mr. B. Rogers. Splendid success has followed the descendants of his herd in that of the Earl of Coventry at Croome Court, and Mr. William Tudge of Leinthall ably maintained the character and reputation of his father's stock.

Not more than a few, however, of the breeders whose names have become historical, can have place in this abridged notice of the Hereford breed. The Rev. J. R. Smythies must be mentioned as not only a breeder but also the first special pleader for the Herefords. Mr. James Rea, beginning in 1816 with Mr. Knight's Snowball 246, a light grey bull of the Skyrme and Tully strains, founded a very excellent herd at Monaughty, and his son, Mr. Thomas Rea, of Westonbury,

bred from the Monaughty stock. Mr. Thomas Roberts, Ivingtonbury, crowned his long and creditable work with a bull whose equal few breeders can hope to produce, the famous Sir Thomas 2228, son of Sir Benjamin and grandson of Sir David. Battenhall 2406, Mr. Thomas Rogers's "Royal" first prize bull at Leicester in 1868, a son of Sir Thomas, was also bred by Mr. Roberts. From Mr. J. Morris, of Stocktonbury, and Mr. W. Pitt, of Kimbolton, came the foundation stock of the herd of Mr. George Pitt, of Chadnor Court, which in 1883 made an average of over £77 for 91 animals. Mr. Monkhouse, of The Stow, bred originally from the stock of Mr. Price, of Ryall, had bulls from various herds, and latterly obtained several, inclnding Sir Thomas, from Mr. Rea. His herd was sold in 1866 after his death, when Sir Thomas realised 390 guineas, purchased by Mr. B. Rogers, the breeder of his sire. Two or three years previously, Mr. Monkhouse had sold some heifers to Mr. T. J. Carwardine, of Stocktonbury, which formed the nucleus of his afterwards famous prize-winning herd, dispersed in 1884, after his death, at a nominal average of more than £125 each for 183 animals; but as the average was raised by the purchases and bids of a bidder who did not take the animals sold to him, and those animals were afterwards resold for less money than the prices declared at the great sale, a little abatement must be allowed. The principal loss was on the bull Lord Wilton, bred by Mr. Tudge of Adforton, and at the great sale sold to Mr. Vaughan at 3,800 guineas; subsequently, when put up to auction, purchased by Messrs. Thomas Fenn, of Stonebrook House, and William Tudge, of Leinthall, his breeder's son, for 1,000 guineas. The very high prices realised for many of the bulls and heifers were unquestionably due in a large measure to the prestige of Lord Wilton and of the Adforton Herefords generally.

Mr. Edwards of Wintercott, and after his death his widow, were very successful as breeders and exhibitors. The Wintercott cow, Leonora, is commonly remembered as one of the

most perfect models of the breed ever seen in a showyard, being classed with Mr. Tudge's heifer Silver Star as almost faultless. The late Mr. J. B. Green, of Marlow Lodge, was one of the strongest advocates of great size, always maintaining that the Hereford breeders would be wrong if they sacrificed the length and grandeur which their forefathers so much admired. There was always to be found at Marlow ample material for the restoration of herds which had lost scale. His old cow Governess, at the age of about 30 years, was one of the wonders of her day. The Showle Court herd, Mr. William Taylor's, founded by his father about the year 1820, gained a high reputation in the show yard, producing among other celebrities the bull Tredegar 5077.

At the great fat stock shows, particularly the Smithfield Club and Birmingham, the Hereford has always held its ground well, often carrying away champion honours. The Herd Book of the breed was established in 1846, the first and second volumes edited by Mr. T. C. Eyton. It then passed into the hands of Mr. Thomas Duckham, who edited volumes 3 to 9 inclusive; after which it was acquired by the Hereford Herd Book Society, by whom the tenth volume was issued in 1879, and the successive volumes come out annually: the 44th, issued in 1913, makes up the number of registered bulls to 30,224.

A thoroughly revised edition of the "History of Hereford Cattle" was published by Messrs. Vinton & Co. in 1909. registered bulls to 18,671.

AYRSHIRE.

Ayr, Renfrew and Lanark are regarded as the native land of the Ayreshire breed of cattle; but the breed is now distributed to far countries, wide apart and differing much in climatic conditions. The moderate climate of its Scotch home, and its own hardy constitution, are doubtless favourable to its adaptation to many gradations between hot and cold countries. It is essentially a dairy breed.

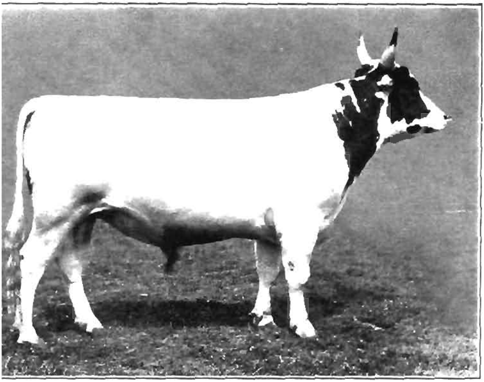
When the best authorities upon its history have told all they had to tell, we still lack certain knowledge of its age and sources. Some of them have placed the fountain-head in the bailiary of Cunningham, North Ayreshire, an old dairy district. Again, Kyle is named as the birth-place of the breed. The ancient Highland race of cattle is credited with a considerable contribution to the mixture of breeds in its composition. Locality would suggest, if evidence or tradition did not, the probability of this having been one of the sources; but the character of the Ayrshire indicates other influences than that of the West Highland race. The Jersey has a place in the short list of alleged or suggested tributaries; also the Holderness variety of the Shorthorn; and the introduction of a Dutch cross has been mentioned; but as in a dissertation upon live stock, written in the last century, Dutch and Holderness are often convertible terms, the former having reference to the Dutch derivation of the cattle of Holderness (and of other districts lying along the east coast), the term Dutch does not necessarily mean a newly-imported breed, but may mean the same as Holderness. Be that as it may, the Ayrshire is now a distinct breed, constant to its recognised type. The precise time of the birth of the breed is not more certainly known than its composition. The existence of an inferior small breed in the bailiaries composing Ayr, about the beginning of the last century, is in evidence. Some time during (and apparently not far from the middle of) the century, about the period of the independent and concurrent improvement of the Longhorn, Devon, Hereford and Shorthorn in England, that small breed, by either improvement or extinction, gave place to the superior Ayrshire. A second period of improvement, concurrent with the multiplication of agricultural associations and the extended influence of shows, covers the last fifty or sixty years.

The Ayrshire is still a small breed. The weight of a cow in full milk, as stated in the authorised standard, is about

10½ cwt. The head should be short, wide at the top, fine down the lower part of the face, with a large muzzle. Formerly a rather long face narrow at the muzzle was required, but taste and fashion have changed upon this and some other points. Instead of the small and crooked horns, and small eyes of the old standard, the horns now are decidedly larger and less bent, wide set at the roots, and of upward growth, and the eyes full and lively. The neck should be longish and fine, straight along the top, clear of loose skin at the throat, and expanding at the sides to meet the shoulder smoothly. The cow, as belonging to a dairy breed, is wedge-shaped, the hind-quarters, by their depth, forming the thick end of the wedge, the fore-quarters comparatively lighter, but not absolutely shallow. The chest, indeed, is fairly capacious. There are the principal works of the machine, and there is space enough for them, but none to spare. All the vital energies appear to exist to minister to the milk vessel. This important part of the organism has its capacity rather in length and width than in depth, being well gathered up behind, and extending forward nearly to the navel; the teats are small and neat, but should not be too diminutive, and are set wide apart.

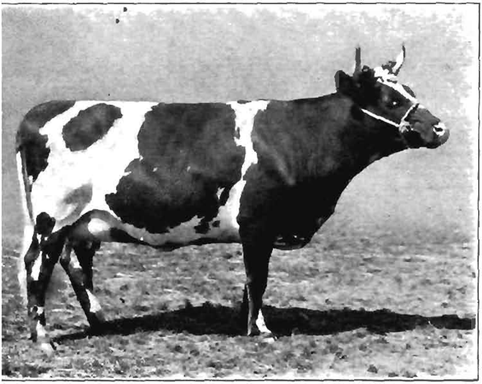
The colours are brown and white, variously distributed, sometimes the brown prevailing, but more or less marked with white, sometimes a white ground with brown spots. The latter appears to have increased within the last twenty years. Black, towards the close of the last century, was allowed, but eventually went out of favour. The markings of white on the brown used to be, more commonly than they are now, numerous spots, with flecks of brown or grey on the white spots, giving a much mottled effect.

The accepted standard required, as most consistent with the type, that the back should be short and straight, the spine well defined, especially at the shoulders, short ribs, arched, the "hind-quarters long, broad and straight," hip-bones wide apart, and not covered with fat. The Ayrshire is fine in the



… Reid.

AYRSHIRE BULL.



AYRSHIRE COW.

bone, stands on short legs, and has broader and deeper thighs than we commonly see in purely dairy cattle, a characteristic consistent with the shape and position of the well up-gathered bag, and the space which it covers in that region. A certain amount of extra thigh-muscle is obviously needed to hold up the weight. The skin ought to be soft, with generous elasticity, and the hair close, yet soft to the touch, or, as it is termed "woolly." The Ayrshire is accounted one of the hardiest of dairy breeds, and in its own country and elsewhere under accustomed treatment is reputed a very prolific breed. Its return in supplies to the dairy is also large in proportion to the food consumed. When bred and reared upon richer land, more sheltered, or under a warmer climate than that of the west of Scotland, it may sometimes lose somewhat of its distinctive character, and become more apt to grow flesh and to fatten readily, the dairy properties, and in some cases fecundity, becoming proportionately impaired. The Scotch-bred Ayrshires, nevertheless, will usually respond to better keep by yielding more and richer milk, and with careful breeding and management, no doubt, the special properties of greatest value may be preserved in most countries to which it has been exported. Excellent reports of its doings come from many lands. America, South Africa, the Australian colonies, and in Europe, Sweden, have imported much good Ayrshire stock.

For the largest public displays of the breed in competitive assembly we must go to the heart of the breeding district, Ayr, or to Kilmarnock, or to the Glasgow Show, or to that of the Highland Society. If the last be held near the home of the breed, its honours attract plenty of the choicest specimens. There are also many local shows where the breed may be seen in strength. The best study, after all, is to be had by seeing the herds at their homes. The Royal Agricultural Society of England first assigned separate classes to Ayrshire cattle in the year 1855 at Carlisle. At the Windsor Show in 1851 "Scotch Horned" cattle, irrespective of breed, had classes,

in which the Ayrshires were victorious. But the International Show at Battersea, in 1862, was the occasion of the first grand representative gathering of Ayrshires at our English Exhibition. Special Ayrshire classes were also introduced at the Newcastle Show of 1864, and at Manchester, Hull, Liverpool in 1877, Kilburn International Show, 1879, Carlisle, 1880, York, Preston, and at subsequent shows, notably that held at Windsor in 1889 to celebrate the Society's jubilee, when the Scotch breeders sent a host of their very best, and English breeders proved at least that the Ayrshire is appreciated in this country. About that time several remarkable sires were exhibited at the national shows. At the Preston meeting of the Royal Agricultural Society, English admirers had a famous object lesson in Mr. W. Bartlemore's Hover-a-Blink 892, the winner of champion prizes in both England and Scotland, bred by Mr. Hutcheson of Stairs. Hover-a-Blink became the sire of Mr. Osborne's Cock-a-Bendie 1204, the champion at Newcastle and at Windsor. Mr. Bartlemore's Silver King, and many other highly distinguished animals, male and female, and their descendants have since kept up the prestige of their blood by winning champion and other prizes at the best shows.

The Ayrshire Cattle and Herd Book Society was founded in the summer of 1877, the first volume of the Herd Book issued early in 1878, and a new volume has come out in each successive year. In 1895 the Society intimated an intention to restrict registration to animals having full pedigrees, but the restriction would not come into operation as regarded the nineteenth volume, then in course of preparation. Leniency had been deemed necessary, previously, on account of the number of genuine Ayrshires with imperfect records of descent.

In evidence of the capabilities of the Ayrshire as a dairy breed, we have the estimate of a most competent authority, Mr. William Bartlemore of Paisley, already mentioned as a prominent breeder and owner of distinguished animals. The

figures given by him are no mere results of guessing, but are deduced from averages ascertained by himself in the course of extensive knowledge of the Ayrshire herds of Scotland. Mr. Bartlemore considers that the yield of an average herd of fifty Ayrshire cows, not specially selected, would be from 630 to 660 gallons of milk in the year, and that he has ample justification in saying that an Ayrshire ought to give in the year more than 620 gallons, showing 12½ per cent. of solids, 12 to 16 per cent. of cream, and from 3½ to 4½ per cent. of butter fat. From the records he has examined, he judges that the average yield of butter in the year should be about 230 lb. Another trustworthy writer's estimate differs so little from Mr. Bartlemore's that the figures need not be quoted here. Both writers are dealing with averages, and their almost exact agreement may be taken as mutual confirmation of their estimates. But picked cows, and cows under special treatment, of course often greatly exceed these averages of averages, just as inferior cows, and cows under bad management, fall short of them. Mr. Bartlemore himself refers to super-excellent milkers and extraordinary butter cows which have yielded much more than the average. One cow, Mr. Holm's champion Snowdrop, at the London Dairy Show of 1889, had not been entered for the milking contest, but at the desire of the judges was put on trial as if she had been so entered. The result proved her far before the winner of the prize in the milking competition, for she made 119 pints, showing a yield of 51 lb. 8 oz., a total of 14·58 of solids and 5·49 of fat. For the size of the cow, and her small consumption of food as compared with cows of many other breeds, the Ayrshire certainly gives an exceedingly generous return. It is often asserted that she is better for the cheese dairy than for the butter dairy. Probably there is truth in this. Some Ayrshire cows, nevertheless, come very near the Jersey butter average, which is the highest average of breeds bred or much known in the British Islands. The food and treatment of Ayrshires generally, in their native country, are such, no

doubt, as to favour the production of caseine; yet if butter be required, the breed that can show specimens almost equal to Jerseys as butter cows, could soon under selection and change of management take its place among the best butter-producing breeds. Taking the Ayrshire cow, however, as she stands, upon her average records of consumption and return, we must allow that her admirers have much evidence and reason on their side when they claim for her the place of second to none as regards percentage of profit upon the farmer's capital invested in dairy stock.

CHAPTER IV.

POLLED BREEDS.

WHITE POLLED.—Domesticated descendants of Polled Park Cattle, a variety of the wild white race of British forests—Herds formed on the dispersion from Gunton Park—Stanton Hall Herd—Gentleness of the Domesticated Cattle—Remaining Traces of Wild Nature in the Calves—Somerford Bull Introduced—Description—The Somerford Park Herd—Blickling Herd—Rev. G. Gilbert's Account—Woodbastwick Herd—Red Points and Black Points—The Brooke Hall and other Extinct Herds.

GALLOWAY.—Antiquity and Classification—Native District—Question of Origin—Description—Weights—Exhibition—Herd Book—Crosses—Growing Popularity of Blue-greys—Breeders—Distribution.

ABERDEEN-ANGUS. — A first-rate Heavy Beef Breed with Dairy Capabilities—Usefulness for Crossing—Crosses of Horned Breeds in Early History of the Aberdeenshire and Forfarshire Polled Cattle—Rudimentary Horns—Variety of Colours—Hornless Black Breed established by Selection—Description—Messrs. Macdonald and Sinclair's History—Reference to Distinct Varieties of the Original Northern Polled Cattle—Modern Development—Mr. Hugh Watson—Mr. Bowie—The Carnegie Family and Herd of the Earl of Southesk at Kinnaird Cattle—Tradition of a Dutch Cross—Cattle Plague—Mr. Wm. Fullerton—Losses from Disease—Other Leading Breeders—Mr. Walker, Portlethen—Noted Bulls—Sir J. S. Forbes—Sir G. Macpherson Grant and the Ballindalloch Herd—Mr. G. Brown (Westertown), his Skill and Misfortunes—Mr. M'Combie—System of Breeding at Tillyfour—Herd Book Shows—Weights and Quality—Distribution—Exportation.

RED POLLED.—Locality and Description—Questionable Supposition of Antiquity of the Breed—Testimony of Young, Culley and

Marshall—Polled Suffolk Dun and Middlehorn Norfolk Red Breeds—*Extraordinary Dairy Properties and Unshapely Frames of the "Duns"—"Middlehorns" crossed with "Duns"—Devon* Herds in Norfolk—Scotch Cattle introduced by Graziers—Prof. Low on Contrasts—Bakewell's Simile—Other authorities—Herd Book Foundations—R.A.S.E. Shows—Mr. Euren on Dairy Records—Exports.

White Polled.

Whatever may be the destiny of the old English breed of White Polled Cattle, of which not many herds exist, a place among distinct domesticated breeds is due to it here. Descended from the ancient semi-wild breed of the parks, described in the second section of Chapter I., it undoubtedly is a variety of the wild original race of the British forests. A few herds were formed in and about the county of Suffolk, when the Gunton Park herd was dispersed in the time of the fourth Lord Suffield, and as some of those herds were severally sold off, other herds have sprung from the animals distributed, but the favour to which the red polled breed has attained leaves little scope for the white in that part of England where the park cattle have gone out to the public. A few years ago a herd was founded by Mr. Robert Emlyn Lofft, of Troston Hall, Bury St. Edmunds, at Stanton Hall, an estate lying a few miles from his residence, but within an easy drive, and in the same county, Suffolk. The cows gathered together were well defined specimens of the ancient type formerly preserved at Gunton, and in 1882, by favour of Sir Charles Shakerley, a fine bull was obtained from Somerford Park in Cheshire. The animals are quiet and gentle, the only trace of wildness appearing in the calves, which at first are shy and timid, until they become accustomed to the voice and to the hand of man. The average size of the full-grown animals does not appear to differ much from that of the Red Polled breed, nor does the rate of growth from birth seem either greater or less under equal circumstances. Weights equal to those of ordinary cattle of the

large beef breeds have been reached by liberal feeding. When the author saw the Stanton Hall herd during the meeting of the Royal Agricultural Society at Cambridge in 1894, about one-half of the herd had red ears, the other half black ears and noses. The effect of the colour is very striking, especially of the black on the ears (mostly black as seen from the front, although at the back only tipped with black), round and on the nose, and in rings or fringes round the eyes, in contrast with the white. The hoof is sometimes, but seldom, black, but the teats are often either partly or wholly so. Sometimes flecks or spots of black are found upon the head, neck, and legs, sometimes on the body, and in the same way the red occasionally spreads beyond the facings, but the less of either colour beyond the characteristic marking of ears, eyes, and nose, the more truly does the animal represent the old pattern. The shape generally is good, particularly of the shoulder and fore-quarters. The hind-quarters are less uniform in neatness, sometimes a little plain, although some animals are good and level over their whole length. Quite in the ordinary condition of dairy stock, Mr. Lofft's seemed a hardy sort, capable of development to much excellence as either dairy or grazing cattle.

At Somerford Park, according to Mr. Storer's careful observations ("Wild White Cattle") the points marked with colour are black, not red, in the pure-bred herd, kept quite distinct from other cattle. One half-bred cow, the result of an experimental cross between an ordinary Shorthorn cow and a pure Somerford bull, was white with red ears; another, similarly bred, light roan, and a third pure white, without either red or black markings. In the pure cattle, black and "flea-bitten" grey, on the head, sides, and legs, were occasional variations from the usual marking. Good specimens of the type, seen and handled by Mr. Storer, were fine in bone, well-shaped and compact, excellent in fore-quarters, girth, breast, plates and fore-flank, with very neat shoulders; the bulls broad across the forehead, with strong, muscular

neck of great substance, much arched, and a tendency to growth of mane. The cows great milkers, yielding exceedingly rich milk, and as remarkable for feminine as the bulls for masculine character, particularly as shown in the head and neck.

The Blickling herd in Norfolk was almost destroyed by cattle plague in 1865-6, a small nucleus only being saved. The late Rev. George Gilbert of Claxton, Norwich, who saw it in 1875, informed Mr. Storer that neither the cows themselves nor their dairy records were equal to those of the time prior to the calamity, which was then too recent to have ceased to be felt severely. When the plague was stayed restoration at once began. A few cows which had been disposed of in the neighbourhood were re-purchased and added to the surviving remnant, together with three or four females from the Woodbastwick herd. To generalise Mr. Gilbert's description of the cattle of the pure old breed (for there were some cross-bred cows which had been introduced to make up the dairy herd), the cows were swan-white, without a yellow tinge, hair long and shaggy, especially about the neck and chine, black ears, muzzles, and circles round the eyes, and all the truest bred had black hoofs. Those which had the most characteristic markings had smaller udders and less apparent tendency to prolonged milking than those which showed indications of a cross, and were longer and broader framed with remarkably wide loins and hind-quarters for cows of their size, not above that of average Galloway cows. The shoulders were neatly laid, and the bull and one of the cows had very deep fore-quarters. The heads and ears differed from those of Galloway cattle, the heads being longer and the ears not so much feathered.

At Woodbastwick Hall, the herd, derived from that of Lord Suffield in Gunton Park, underwent a change by means of selection, from the black to the red markings. We have already seen that dark brown markings were sometimes found in Gunton Park, although black was the colour preferred. It

appears that in all the herds descended from the Gunton cattle brown or red ears have from time to time appeared. As that colour commended itself more than black to the taste of the Cator family or their agents, red-eared calves were carefully retained, and more procured from Blickling, where the taste was for black, in exchange for black-eared offspring of the Woodbastwick herd. Thus, in course of time, the separate colours became both well established. Possibly the accidental circumstance of the original Gunton cow taken to Woodbastwick having dark brown ears, and being the dam of the bull first used, gave the preference for the red, and as change of blood was soon required after the rise of the herd from a single cow and her son, and red-eared calves were to be had from Blickling, convenience fostered, if it did not indeed create, the fancy for red.

Among the names appearing in connection with herds now extinct, those of Kerrison, Denny, and Scott, are more or less prominent. Mr. Storer, on the authority of Mr. Gilbert, has referred to a herd belonging to Sir Roger Kerrison, then of Brooke Hall, about the close of the last century. Some of the cattle were given to Sir Roger's sister, Mrs. Freeman Denny, Mr. Gilbert's maternal grandmother, who kept them at Bergh-Apton. Two were given to Mr. Gilbert's mother, on her marriage, about 1812, and kept at Chedgrave Manor, where their descendants, true to type long after bulls of the same breed had ceased to be used, were well remembered by Mr. Gilbert.

GALLOWAY.

This lesser of the two North-British breeds of polled cattle, a very hardy and undoubtedly an ancient breed of the grazier's or beef-making class, has its principal home in the south-west corner of Scotland. As its name implies, it belongs primarily to the district of Galloway, comprising Wigtownshire and Kirkcudbrightshire, although now the chief breeding area includes Dumfriesshire and the adjoining English county of

Cumberland. A line drawn round this group of counties and stewartries would fairly enough show the extent of the recognised Galloway breeding country, yet would exclude some good herds. Indeed, of late years pure and highly-bred herds have risen in quite a considerable number of English counties; but beyond the extreme north-western county, no part of England can yet claim the breed as one that is naturalised upon the soil. In Scotland the line may fail, even more than on the English side of the border, to take in all of worth, but the county boundaries already described seem to be the fairest and most convenient landmarks for the purpose of indicating the headquarters of the Galloway cattle.

As regards the origin of the breed, in the absence of written records we may with much confidence point to its characteristics as containing more than half the story. Judging from them, can we doubt that the Galloway is a polled variety of the West Highland breed? How the horns have been bred away is a question that need not perplex the most curious inquirer. A single polled animal taken into the midst of thousands of horned stock would dishorn, in course of time, the progeny of the entire horned race of the district, through a process of selection for the purpose of breeding polled cattle. It is not that the proportion of, say one part to ten thousand parts, could eventually overpower the ten thousand; for we see constantly examples of the rarity of effectual resistance of one part against a proportion of thirty-one or even fifteen times its own proportion to the whole, the fifteen-sixteenths representing the fourth, the thirty-one thirty-seconds the fifth, consecutive cross of one distinct breed upon another, represented by the proportion one, and when those proportions are much exceeded in the super-incumbent element, the properties associated with the minute fraction usually disappear. But if all the breeders of a certain district desired to substitute polled for horned stock, and had but one polled animal with which to effect the change, their wish could be realised within a few generations by multiplying descents from the one polled

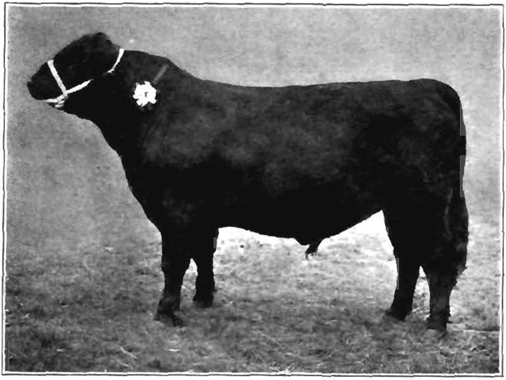
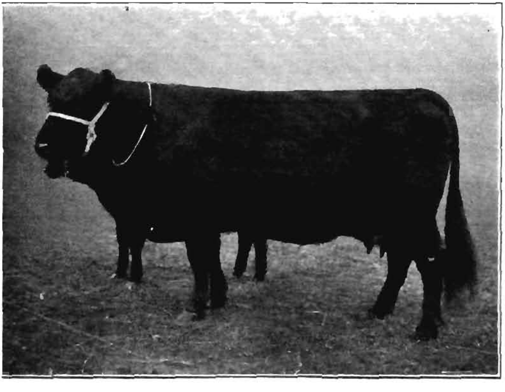


Photo by C. Reid.

GALLOWAY BULL.



animal, and selecting always only the descendants inheriting the approved peculiarity of that one, the absence of horns. If in all other characteristics the properties of the horned breed were preferred, those properties could be preserved in connection with the polled character, just as easily as the horned head exchanged for the polled head. It is simply a matter of taking care to breed only from the animals having the head of the one type in combination with the body of the other type, in strongest likeness to the original types. Alternatively, the hornless character might be an accidental variation, perpetuated precisely in the same way as a strange characteristic introduced through a cross. In the case of a cross, unless manipulated very skilfully with the definite object of altering the breed only to the extent of absence of horns, some modification of general character also would probably occur; and besides this, the polled breed might be taken into localities and under influences differing from those to which its horned ancestors were accustomed, and so undergo modification to some extent. These considerations may perhaps suggest explanation of differences between the West Highland and the Galloway breeds.

Whatever its origin, the Galloway has been for a long time a very distinct breed. Although formerly red Galloways were not uncommon, the fashion of many years to breed for the black colour has fixed that as the recognised colour of the breed. In the structure of the frame, too, it is exceedingly uniform (within a certain range of variation, marking the individuality of different specimens, one excelling in this point, another in that, as in all domesticated breeds); and there is much sameness in the carriage, the coat of hair, and the general character, so that a home-bred herd, under intelligent and careful selection, becomes a herd of admirably well-matched animals. The tendency to adaptation to pasture and climate is nevertheless apparent in this as in every other breed; size, flesh, hair and other characteristics become affected by the conditions of life.

The Rev. Dr. John Gillespie, editor of the Galloway Herd Book, in one of several articles contributed in different years to the *Live Stock Journal Almanac*, drew attention to the fact that there is no race of cattle in regard to which the importance of a good head is more generally or more strongly recognised than in regard to the Galloway. Unless the head be good, the animal seldom breeds satisfactorily. The head of true type is short and wide, with broad forehead and wide nostrils. The late Mr. John Algernon Clarke, describing the Scotch breeds of cattle in his section upon "Practical Agriculture," in the special "Memoir of the Agriculture of England and Wales" (the bulky Part II. of Vol. XIV., *Journal R.A.S.E.*, of the year 1878), describes the head of the Galloway as of moderate size, with large, rough ears, and full but not prominent eyes; and observes that although of larger frame than the West Highland, the likeness to that breed is so strong that he has been called "a Kyloe without horns."

In a true type Galloway the neck is neat at the throat, without being in the whole lighter than is desirable in a beef breed, the breast neat and full, chest deep, the top straight and level, well covered with flesh and as seen from before or behind the animal, more evenly rounded, or barrel-like, along the whole carcase than in most breeds. The hips lie very "snug," and the hind quarters are long and nicely packed. The skin yields freely and generously to the hand, and the hair, although thickset and long, is soft to the touch, and in the now usual black colour, bright and glossy. In disposition very quiet, the Galloway is a ready and rapid thriver, and having plenty of lean flesh, abundant in the best parts, and fattening freely at maturity, makes beef of prime quality and is equally satisfactory to grazier, butcher, and consumer.

The weight of the Galloway may be fairly enough estimated from a few extracts from the records of the Birmingham fat-stock Show and of the Smithfield Club. Bearing in mind the fact that animals exhibited at the annual shows of fat stock

are mostly such as have been highly fed for competition, we must also remember that the largest and heaviest animals are not always the best for exhibition. A neat, level, symmetrical bullock can beat one of greater size but coarser frame and less evenly distributed flesh. It is quite likely, therefore, that Smithfield and Birmingham weights may be below the maximum of a breed, although the high condition of the majority of the cattle in the classes at those shows warrants us in supposing them to be above the average of that bred.

At the Birmingham Show of 1895, two pure-bred steers alone represented the Galloway cattle, both shown in the class for ages under four years. Their respective ages, weights and average daily gain in weight were, first prize steer, 996 days, live weight 1655 lbs., and average daily gain from birth, 1·66 lb.; second prize, 1039 days, 1767 lb., and 1·70 lb. gain. At the Smithfield Club Show directly afterwards, the latter of these steers was again second, but was reported as having wasted considerably in consequence of the journey to London. He weighed, however, 15 cwt. 3 qrs. 6 lb. (live weight) and when slaughtered after the show, had a carcase weight of 1200lb., the percentage of carcase to gross live weight being 67·80. The first prize and breed cup were awarded to a steer aged 2 years, 9 months and 24 days; live weight 16 cwt. 3 qrs., 3 lb., daily gain 1·83 lb.; weight of dressed carcase 1210 lbs., percentage of carcase to gross live weight 64·40; hide 97 lb. and loose fat 75 lb. The first prize Galloway heifer, aged 2 years, 9 months and 26 days, weighed alive just fifteen pounds over 13 cwt.; her daily gain of live weight was 1·43 lb.; weight of dressed carcase 940 lb.; percentage of carcase 63·90; hide 75 lb., loose fat 72 lb. A steer of Sir Robert Jardine's, winner at the Smithfield Show in 1887, proved in live weight 22 cwt.

For various reasons, however, the Galloway has not appeared at the Smithfield Club Show in strength commensurate with its importance as a breed. The distance from its northern home to the English Metropolis may partly explain its small representation at Islington; but a further reason has

existed until recently, first, in the want of separate classes, and when Galloway classes were added to the Islington schedule, then in what was considered by Galloway breeders an inconvenient division of the classes of steers, throwing into competition in one class the young steers with steers of mature development. The age dividing the classes was altered, but time had not tested the willingness of breeders and exhibitors to avail themselves of the new regulation. The weights at Islington are therefore of comparatively little value for our present purpose. The younger steers, however, of the show in 1896, indicated a movement on the part of breeders to make use of improved opportunities.

The Royal Agricultural Society of England, in 1862, introduced special classes for Galloways, at the Battersea International show, where some good specimens of the breed appeared, although certain classes were not filled. After that year separate classes were repeated at uncertain intervals, so that when Galloways had a fair field for exclusive competition, their breeders usually were unprepared to take full advantage of the opportunity. Their best display was at Newcastle-upon-Tyne in 1887, when 65 entries comprised a large number of animals of exceedingly high merit.

The first volume of the *Polled Herd Book*, compiled by Mr. Edward Ravenscroft, of Edinburgh, and issued in 1862, contained the pedigrees of Galloway as well as of Aberdeen-Angus cattle. Their entries extended to the fourth volume. Messrs. Ramsay and Adamson, then Mr. Ramsay alone, who had the copyright, edited the work; but the Galloway Cattle Society, acquiring the Galloway section, made that the nucleus of a distinct work, edited by the late Rev. Dr. Gillespie. The 32nd volume published in 1912 brought the number of bulls registered up to 11,648 and cows to 22,742.

In its crosses with several other breeds the Galloway produces some exeedingly useful varieties of cattle. Among half-bred Galloways we often find some of the very finest beef animals. The blue-greys of Cumberland, bred from the

Shorthorn and Galloway, have been long held in high estimation and eagerly sought both for the dairy and for grazing, and their excellence has induced breeders in other parts of England, and elsewhere, to obtain Galloways for the purpose of producing animals of the same approved blend.

The spreading fame of the Galloways secures for it an extensive demand beyond the British islands, and within the last few years considerable numbers have been exported.

Aberdeen-Angus.

A heavy beef breed of the first order of merit, and not commonly classed with dairy cattle, the Aberdeen-Angus, nevertheless, descended from superior dairy stock, inherits a tendency to milk well under favouring conditions. Excellent dairy cows occasionally appear under normal management, affording assurance that by special breeding and treatment for increased quantity of milk, with willingness to sacrifice some beef to gain that object, the breed might be soon converted to dairy purposes mainly, with a tendency to kindly fattening as a secondary merit; or, at the will of the skilful breeder, constituted what is termed "a general purposes breed." Beef-making, however, is now its strength, *plus* a moderate yield of milk reputed as above the average richness in butter-fat.

For crossing, this breed has proved remarkably useful. In crosses with the Shorthorn it has produced some of the best carcases in the beef trade of the North of Scotland with England, and some of the grandest animals exhibited at the Smithfield Club and other English shows; whilst in Ireland also it has done good service in the improvement of the cattle of the country; and the results of recent experiments have demonstrated its fitness to cross with the small native cattle for the production of a heavy-fleshed and early maturing polled breed of modified size, specially suitable for certain localities, and for convenient transit as live stock, in either

store or fat condition. These various and somewhat widely differing capabilities of usefulness open out a wide prospect for the blended breeds of the "Buchan Humlies" and "Angus Doddies," as the Lowland polled cattle of the counties of Aberdeen and Forfar were called, and the horned cattle of the Aberdeenshire Highlands brought down to the low country and there intercrossed with the polled stock. The earlier results of the mixture were various. Some of the cattle so bred had horns proper, some were hornless, and some had "scurs," called "slugs" in some of the polled cattle-breeding districts of England, loose rudimentary horns, hanging from the places where in ordinary horned cattle, horns proper, firmly fixed on their cones, grow out from the head. Colour likewise varied. The cattle of Angus in Forfarshire and Buchan in Aberdeenshire, thus composed, became the sources of the present fixed breed, which extended first to neighbouring districts, and eventually becoming famous was distributed to many other countries and to distant lands. In the beginning of the nineteenth century it had not reached the stage of fixity. Its present character is very marked and constant, in crosses frequently proving to be the one most powerfully represented, sometimes to the verge of exact reproduction.

The breed as fixed in type after a period of gradual improvement, extending over the greater part of the last century, is almost wholly black. Other colours, formerly not uncommon, are now, having been carefully weeded out, comparatively scarce. A tinge of brown or claret colour may be seen sometimes in good specimens. Red, even brindle, and any considerable extent of white marking, have become rare; and "scurs" are more strongly condemned than variations of colour. The head, not large in proportion to the size of the body, is totally hornless; and has the tapering top, somewhat of sugar-loaf form as seen from the front, characteristic of true polled breeds. Between the full, dark, mild eyes, set in well defined sockets, the breadth is ample; the lower

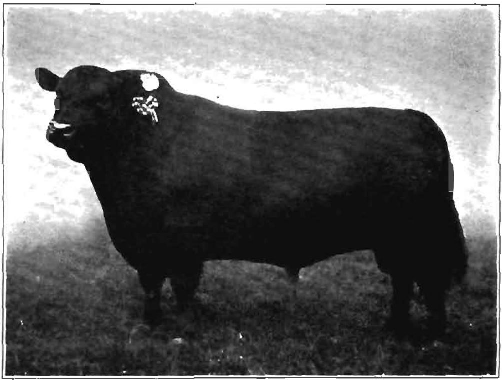
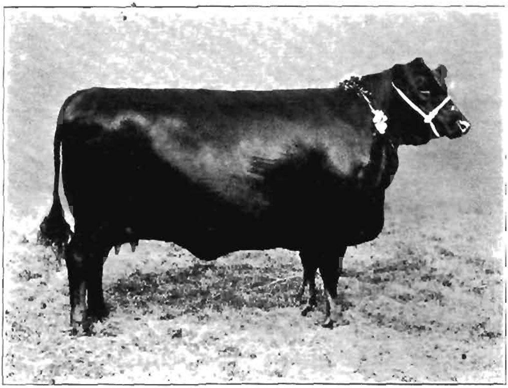


Photo by G. H. Parsons.

Aberdeen-Angus Bull



part of the face, not too long, is finely cut out, becoming small towards the muzzle, which is comparatively broad and flanged, with widely expanded nostrils. The whole facial character is pleasing, and indicative of much careful breeding. The ears, kept well up and attentive, are of fully medium size, looking sometimes rather large than otherwise when the hair is on (especially in young stock), but not generally or thickly covered, filled, and fringed with hair as the ears of the Galloway, whose general coat is heavier and rougher than that of the Aberdeen-Angus. In a description of some of the best of the "Angus doddies" of about eighty years ago, however, we have an account of extraordinary coats of hair, and peculiarly large, hairy, well set ears.

In harmony with the refined moulding of the cow's head and face, is the elegance, scarcely absolute lightness, but rather neatness, of the throat and fore part of the neck of the high-class cow. The head is indeed very prettily set on, and between the thick beefy part of the neck next the body, and the head, the tapering throat enhances the gracefulness of the animal's style. In the bull, the muscle of the neck, big and rounded, rising from the shoulder gradually to the top of the arch, whence the outline descends to the head, gives a stout, masculine character. The female, according to her posture, has the line of the neck more or less nearly horizontal from the shoulder-top to the head, which is sometimes carried stylishly high as she walks, but more commonly at ease, neither elevated nor drooping. On the whole, there is much of that which is aptly enough termed smartness or gaiety, in the character and carriage of the breed, without any excess of it in the direction of undesirable restlessness; neither is it enhanced by height. The body, indeed, is deep, but the legs, fine in bone, being also short, do not raise it high from the ground, and the fully proportionate length of frame, and the roundness of the rib, reduce the effect of the depth of side. The animal consequently looks smaller than its weight proves it to be. The shoulders

and hips, in the best representative specimens of the breed, are snugly laid in and covered, the crops and loin thickly packed with solid flesh, which is continued over the hind-quarters, but not in the form of rolls such as (composed largely of gristly fat) form the mid-quarter "cushion" in highly fed cattle of some other breeds. It is not that there is a want of muscular furnishing from the hip (often hidden under an almost even covering of flesh) to the tail, but that the flesh on the hind quarters is so free from superfluous fat as to slope off, smooth and rounded into the thick and heavy thigh, without break or distinguishing line. The body, therefore, perhaps as nearly approaches to the form of the proverbial gun-barrel as that of any other breed. The deeply covered neck-vein, the thick leaf of flesh under the floor of the chest, extending between the fore-legs to the brisket, and the ample substance of flank, twist and thigh, also show the generous tendency to make flesh on every part of the frame, which has no coarse bone in its structure.

A very minute and exact description of the Aberdeen-Angus cattle of both sexes is given in the standard history of the breed by Messrs. Macdonald & Sinclair (first published in 1882), comprising the observations of various other authorities together with the original and critical remarks of the authors.

In summarizing the evidence as to the origin of the breed the new edition of the History remarks that the specific reference to the existence in 1523 of black polled or hummel cattle in the Culter district of Aberdeenshire, contained in the Spalding Club Antiquities, and to the evident value attached to them by this definite description, is of the highest importance. It is a piece of testimony that confirms the impression previously formed that this race is of great antiquity, and that it has been cultivated from the earliest time in the districts where the breed has been established and improved. In the summary of written evidence it is clear that most of the authorities were dealing not with the estabishment of a distinct breed, but with the general practice of cattle-rearing in Aber-

deenshire and Forfarshire. There can be little doubt that while they describe accurately what was going on in commercial stock-breeding, they do not grasp the main fact that amid all the mixing of varieties in carrying out the aims of agriculturists in producing such stock as were required for the varying needs of the times, a nucleus of polled cattle was maintained in a pure state, and that from it the present noted breed is descended. For at least four hundred years this race has been kept distinct, and it possessed such hereditary power that it was able to maintain its character and to form the foundation of the Aberdeen-Angus breed. The sources need not have been numerous, but they were carefully guarded. They formed the main stream which can be traced to a very remote origin. It is not contended that in the various experiments that were made the blood, at the outset, was kept absolutely pure, but the tributaries were absorbed and incorporated. The character of the breed and its permanence were such that they withstood all experiments, and the pure race is directly descended from the original ancient source, only slightly modified to adapt it to the fresh demands that were made upon it by the advance of the country and the purposes it was called upon to serve. From the old Doddies of Angus, and the Hummel Cattle of Aberdeenshire, which were of similar origin and character, there can be clearly traced the present Aberdeen-Angus breed, improved and developed on the lines originally laid down.

Mr. James R. Barclay, Secretary of the Aberdeen-Angus Cattle Society, has corrected the erroneous and oft-repeated assertion that many of the present-day black-polled cattle in Aberdeenshire and the North were formerly horned. At one time, he says, there were two distinct breeds of cattle, both passing under the general designation of Aberdeenshire cattle. The horned breed was "manufactured" in order to meet the special requirements of the plough and the tilling of the soil, and when horses took the place of oxen in the work of the farm they continued to be reared and sold as store

cattle, chiefly because they were found to answer droving purposes well. But when turnip husbandry was added to the agriculture of the North, and when the farmers of Aberdeenshire found that they could get better results from the feeding of the cattle they raised than from selling them in a lean state to be finished in the South, then the horned breed, slowly but surely, was allowed to die out, and the native polled breed was turned to as being the more suitable for the altered conditions. It was at this stage that Mr. McCombie, of Tillyfour, came forward as the champion of the breed, and it is from this date that the present-day history of polled cattle in Aberdeenshire takes its origin.

The breed of the present day, comprising representative descendants of the blended polled hreed of Buchan and Angus, is quite a distinct and true breed, constant to type. Many of the early cattle were of symmetrical form, but others were smaller and often ill-fed. Messrs. Macdonald and Sinclair, in their summary of the results of the modern improvements, do justice to the symmetry of the original stocks, and observe that it has been more than maintained in the present breed, is unsurpassed in any other of our breeds, and now leaves little to be desired, adding that the cattle as improved "have wider and better sprung ribs than their ancestors had, and are also longer and better filled from the hooks backwards, as well as more richly fleshed, finer in the bone, of superior quality, and sweeter and more gay, especially about the head. Their general fattening properties too, notably in regard to early maturity, have been greatly improved." The history of the improvement, indeed, may be regarded as really that of the breed, for it was in the course of the improvement effected witbin the present century that the breed acquired distinctness and fixity, chiefly in the hands of a few eminently skilful men.

The first great name on the roll is that of Mr. Hugh Watson, of Keillor. Following a few pioneers whose efforts to improve the polled cattle of Forfarshire and Aberdeenshire,

and to establish herds of pure polls in both counties, are believed to have begun in the last century, Mr. Watson, born in 1789, commenced farming on his own account, at Keillor, in 1808, with half-a-dozen of "the best and blackest" cows and a bull from his father's stock, and in the same year bought at Brechin, Forfarshire, ten heifers of various colours, black, brindled, and black streaked with brown along the back, and the same colour at the muzzle, together with a black bull, named Tarnty Jock, the first "Jock" of the Keillor herd. These, selected as the best at Trinity Muir Market, and the animals he had from his father, formed the foundation of his herd. From one eminent authority (Mr. W. M'Combie) we learn that he began to exhibit cattle in 1810, and in his lifetime won about 200 prizes for cattle, sheep, and thoroughbred and heavy horses; but the historians of the breed (Messrs. Macdonald and Sinclair), on the authority of Mr. Watson's son, Mr. William Watson, extend the list of prizes won for various kinds of stock in England, Ireland, Scotland, and France to upwards of 500. In 1829 Mr. Watson first exhibited at the Highland Society's Show, at Perth, and in the same year some of the same animals attracted much notice also at the Smithfield Club Show in London, after which, the results of the "block test" added greatly to the rising fame of the breed. The sire which was accounted to have done the most good in his herd was Old Jock, registered as No. 1 in the Herd Book, fourth in the direct male line descent from Tarnty Jock (*Hist.*, chap. vi.), and described by one highly credited authority as the best polled bull he had ever seen, and by his breeder's son, as, in his breeder's opinion, the best bull he had ever bred, a grand grazing animal, of iron constitution, and superlative quality. Calved in 1842, he carried away the first honours of the Highland Society in 1843 and 1846, and sweepstakes at ten years of age, and at the Royal Irish Show in 1847, under the name of Strathmore (his identity established by Messrs. Macdonald and Sinclair), was the first prize bull. Of the female polls at Keillor, The Prima Cow,

registered as Old Grannie, No. 1 (the cows as well as the bulls having reference numbers), was distinguished on account of her longevity, fecundity, and excellence as a breeder. A cow of most robust constitution, and a regular breeder, she was kept by Mr. Watson for the purpose of testing, first, the length of time such a cow could be profitably kept, and, secondly, the length of life, until she died of old age in the middle of her 36th year, having been calved in the beginning of 1824, and dying on the 1st of July, 1859. She bred 25 calves, the last (Hugh 130, an excellent bull, used by Mr. Thomas Ferguson, of Kinochtry) born when she was in her 29th year, and she ceased yielding milk after she had suckled and reared her 24th calf. A photograph taken two days before her death was added to the Prince Consort's collection of cattle portraits at Balmoral, and a lithograph copy appears among the illustrations of the first volume of the Herd Book. She was exhibited as a curiosity, for which a medal was awarded to Mr. Watson, at the Highland Society's Show in 1858. A four-year-old ox, son of Old Grannie, won the Purcell Challenge Cup at Belfast, and afterwards, becoming the property of the Prince Consort, was put to the plough at Windsor, where he died when past the age of 17 years.

Mr. Bowie, Mains of Kelly, began breeding Angus polls in 1809 or 1810, within a year or two from the time of the founding of the Keillor herd. His herd, continued by his son, Mr. Alexander Bowie, stands out in the history of the breed as the source of some of the most influential sires in other distinguished herds, including those of the Earl of Southesk, at Kinnaird Castle, also in Forfarshire, and Mr. William M'Combie, of Tillyfour, in Aberdeenshire.

The first herd of polled cattle at Kinnaird Castle, unhappily destroyed by cattle-plague in 1865, was of remote and not definitely known origin. Good polled cattle were there certainly very soon after the beginning of the present century, but the breed was supposed to have been, most probably, long previously in the possession of the family. The best

information procurable as regards this particular herd was the communication to the authors from the Honourable Charles Carnegie in which he gave his own recollections and earlier particulars handed down to him from preceding generations. Curiously enough (as in the history of the Shorthorn and the Hereford we have traditions of the importation of stock from Holland or from Flanders), there is in that communication a reference to grey polled cattle, called "droners," supposed to have been descended from Dutch cows brought over by a Dutch company once engaged in attempting to reclaim the basin of Montrose. Although a second herd was founded by Lord Southesk some years afterwards, and descendants of the first herd were gathered into it, the annihilation of the old Kinnaird herd, in the height of its excellence and fame, is regarded as one of the heaviest losses that ever occurred in the history of a great national breed of British cattle.

Besides extensive loss in other important herds of Angus and Aberdeen cattle from cattle-plague, during the two years, from the summer of 1865, of the presence of that disease in Scotland and England, a very serious outbreak of pleuro-pneumonia in the herd of a distinguished breeder, whose name deserves an early place, and a place of honour upon the list of improvers, must be noticed here. It was that outbreak which diminished the choice herd of Mr. William Fullerton to the extent of a hundred animals, in the year 1859. By three other attacks also of epizootic disease, the herd of that famous breeder and judge of polled cattle, during his efforts to rebuild it, suffered heavily. Mr. Fullerton began his work as a breeder of superior cattle at the Mains of Ardovie, in 1833, and afterwards farmed at Ardestie. In his herd some celebrated families in the herds of Mr. Hugh Watson, of Keillor, and the great Aberdeenshire breeder, Mr. William M'Combie, of Tillyfour, had their origin, and it is almost entirely through animals sold by Mr. Fullerton before his grievous losses from disease that descendants of his cattle are

now very numerous in herds of the highest reputation. His most noted bull, Panmure 51, a Highland Society's first winner, bred by Lord Panmure in the spring of 1840, and purchased by Mr. Fullerton in the autumn of 1841, proved one of those extraordinary sires, whose impressiveness, wherever they go, is traceable in the excellence of their descendants. "It is to Mr. Fullerton," Mr. M'Combie, of Tillyfour, acknowledged, "I owe my success as a breeder: I shall always look up to him as the founder of my stock"; a tribute gracefully paid to whom it was due, and, as a generous acknowledgment, reflecting honour upon the memory of Mr. M'Combie himself. From this testimony it is evident that Mr. Fullerton was not only happy in his choice of original stock, but also eminently judicious in his course of breeding; and it is abundantly confirmed by the reputation of Mr. Fullerton among Aberdeen-Angus breeders, and by the great excellence, still, of his herd's descendants.

Messrs. Mustard, Ruxton, Ferguson, of Kinochtry, Scott, of Balwyllo, Aymer, Pierson, Lyall, Lyell, Leslie, of The Thorn, Archibald Whyte, of Spott, Col. Dalgairns and others, have also prominent places in the history of progress in Angus. It is impossible here to give more than a few names. In Kincardineshire, Mr. Robert Walker, of Portlethen, whose herd, founded in 1818, is understood to have originated in stock long previously owned by his family, and to have undergone improvement in his hands mostly from about the year 1826. He bred the celebrated bull Fox Maule 305, and purchased Sir Thomas Burnett's Banks of Dee 12, a sire successfully used at Portlethen. (Sir Thomas Burnett, of Crathes, was succeeded by his brother Sir Alexander, and he by Sir James Burnett, all distinguished breeders). Mr. William Fullerton's Andrew 8, calved in 1847, was also the source of much good in the Portlethen herd, and became the sire of Mr. Walker's Young Andrew 9, one of whose sons, Raglan of Portlethen 208, took third honours at the great Paris show of 1856, where the second prize was adjudged to

Marquis 212, bred by Mr. Hugh Watson and shown by Mr. Walker, the first prize to Mr. M'Combie's Hanton 228, bred by Mr. Alexander Bowie, Mains of Kelly, and described by Mr. M'Combie himself as one of the fortunes of his herd. Sir John Stuart Forbes, in the same county, took a leading part in forwarding the publication of the first volume of the Herd Book, and Mr. Hector, of Fernyflatt, was a noted and successful breeder whose herd produced Hector, sire of the famous Panmure 51. In Banffshire and the adjoining county of Moray, the estate of Ballindalloch was from time immemorial the home of a very superior herd of polled cattle, which, mingling with the polls of Angus and Buchan, contributed largely to the advance of improvement, and on its ancestral ground has been raised to high excellence by Sir George Macpherson Grant, Bart. It has the reputation of being, according to Mr. M'Combie, "perhaps the oldest herd in the north;" and upon the dispersion of Mr. M'Combie's herd, as stated by Messrs. Macdonald and Sinclair, indisputably took the first place among the herds of the Aberdeen-Angus breed of cattle. The last-named authorities give the names of a number of other leading improvers in Morayshire and Banffshire, from the list of which one may be here selected as that of a breeder doubly entitled to notice by his singular skill and heavy misfortunes. Mr. George Brown, of Westertown, Fochabers, gave distinct evidence of a power like, if not indeed amounting to, that of genius. He had a mental type before him, and he worked up to his ideal. When many years of patient labour had put him in possession of a herd wrought out according to his pattern in the mind's eye, an untoward event incidental to the successful exhibition of some of his stock brought pleuro-pneumonia to his farm: the herd was reduced to seven animals. With unbroken energy he set to work afresh, raised from the small nucleus a second herd, and had a few years of success in the showyard, when death in 1874 ended his rising fortune as a breeder. The herd was dispersed in the same year.

Aberdeenshire, as one of the principal native counties of the northern polls, has a long list of breeders' names; foremost among them, on the ground of comparative influence, being that of Mr. William M'Combie, of Tillyfour, already mentioned, to whose opportune support the Aberdeen-Angus breed is largely indebted for its preservation at a critical time when the practice of cross-breeding with the Shorthorn for the production of grazing stock threatened the existence of the polls as a distinct breed. In his book on "Cattle and Cattle Breeders," a source of information upon many other herds, Mr. M'Combie has said comparatively little about his own herd, beyond handsomely acknowledging its indebtedness to stock obtained from several of the breeders on whose doings he discourses freely. A full account, however, is given in the History of the breed, which, besides showing the composition of the herd and the system of breeding pursued in it, supplies notes on some of the principal animals. Mr. M'Combie, born on his father's small estate of Tillyfour in 1805, began farming there on his own account in 1829, after being a few years associated with his father's great business in the North of Scotland cattle trade, and in 1830 founded a polled herd, which had an existence extending over half a century, and was dispersed in 1880, a few months after his death. His own book gives his views upon the subject of cattle-breeding generally, and those views, as might be expected, mean the system adopted in his own herd. He was strongly in favour of pedigree, particularly emphasising the necessity of excellence in the ancestry of the bull; for he maintained, as proved by his experience, "that the male has most influence in breeding." He would, nevertheless, however good the blood, insist upon the testing of the bull, because, as he observed, until that had been done "no one can affirm that he has a first-class sire." A thoroughly well-bred bull having proved to be a thoroughly good sire, "money should be no temptation: he must not be sold." With regard to in-breeding, he considered it, when continued to great

length, "against nature," but "it may be pursued for a time," e maintained, "until the type is developed." The historians before quoted point to his working into his herd a fresh infusion of the Panmure blood, through the in-breeding of Hanton's descendants, as a practical modification of his doctrine. Theoretically he taught that by prolonged in-breeding, good quality was maintained or improved, but size reduced and constitution enfeebled. Mr. M'Combie gained most distinguished honours at the great French shows at Paris in 1856 and 1878; at Poissy in 1857, and at the Paris Fat Stock Show in 1862; his champion groups of 1856 and 1878 especially showing superlative excellence.

Mr. M'Combie, of Easter Skene, a relative of Mr. M'Combie, of Tillyfour, founded a herd in 1840, and working much upon the Panmure blood, raised it to high reputation both in the show-yards and as a breeding herd. Among other noted animals bred by him was Valiant, the sire of two of the champion group exhibited by Mr. M'Combie, of Tillyfour, at Paris in 1878.

Mr. Robert Walker, of Montbletton, where he founded a herd in 1831, belonged to a family of successful breeders of polled stock, at Fintray, and had in it some of the blood of the old sort long previously in the possession of his family. From Montbletton several famous breeders, including Mr. M'Combie, of Tillyfour, obtained stock for the maintenance and improvement of their breeds.

The Polled Herd Book, originating in a movement about the year 1842, but delayed in consequence of the destruction of the manuscripts by fire in 1851, was again started in 1857, and the first volume, the result of Mr. Edward Ravenscroft's labours, was published in 1862. Losses by cattle plague caused delay. Then the copyright passed into the possession of Mr. Alexander Ramsay, with whom for a short time Mr. Adamson was associated in the editorship, afterwards conducted by Mr. Ramsay alone. The second volume was issued in the year 1872, and the copyright was eventually

transferred to the Polled Cattle Society, incorporated 1879. The first four volumes included Galloway cattle, the fifth and subsequent volumes admitting Aberdeen-Angus cattle only. The name of the society was changed to the Aberdeen-Angus Cattle Society, and the 37th volume of the Herd Book appeared in 1913.

In weight of carcase, the Aberdeen-Angus rivals the heavy breeds generally; in quality of beef it is said to be second to none; and in results under the "block test," appears to be quite of the first order of merit. Its capability of early maturity is abundantly demonstrated at the fat stock shows. The Birmingham and Smithfield Club Shows of most years have contained some remarkable specimens.

The breed is becoming widely distributed in the three Kingdoms, and extensively exported to the British Colonies and foreign countries.

A new and completely revised edition of the "History of Aberdeen-Angus Cattle" was published by Messrs. Vinton & Co. in 1910.

Red Polled.

Norfolk and Suffolk are the native counties of the Red Polled breed, known formerly, and at one time described in the catalogues of our national shows, as "Norfolk or Suffolk Polled." In the first volume of the "Red Polled Herd Book," issued in 1874, the standard description of the breed is divided, one section giving "essentials," the other the "points of a superior animal." The essentials are red colour, white permitted with restrictions to the end of the tail, the udder, and a little before the udder along the inside of the flank; and absence of horn; "slugs," or abortive horns (such as in Scotland are called "scurs") being strictly forbidden. In the "superior" class a *deep* red is required, with an udder of the same colour, white at the end of the tail allowed; the nose must not be dark or cloudy; the head and throat must be neat, the eye full, a tuft of hair should hang over the forehead,

and "the frontal bones should begin to contract a little above the eyes, and should terminate in a comparatively narrow prominence at the summit of the head." Although a special heading is given to form, nothing is inserted in this standard about the form of the body.

A patient search through topographical and agricultural works of the last century, works containing descriptions, by competent authorities, of the live stock of every parish and township in the counties of Norfolk and Suffolk, fails to afford confirmation of the theory that the breed (at least in anything like its present character) is one of any considerable antiquity. The Suffolk Polled cattle, however, were described by Arthur Young a hundred years ago, and by his contemporary, George Culley, who mentions them as "Suffolk Duns," the breed being at that time of the dun colour.

Young, secretary to the Board of Agriculture, writing in 1794 ("General View of the Agriculture of the County of Suffolk," p. 38), gives the following account of them:

"The cows of Suffolk have long been celebrated for the great quantity of their milk, which, I believe, much exceed, on an average, that of any other breed in the island, if quantity of food and size of animal aretaken into account. . . . . The breed is universally [doubtless meaning 'invariably'] polled, that is without horns; the size small; few rise, when fattened, to above 50 stone (14 lb.). The points admired are: a clean throat, with little dewlap, a snake head, clean, thin legs, and short; a springing rib and large carcase; a flat loin, the hip bones to be square and even; the tail to rise high from the rump. This is the description of some considerable dairymen. But if I was to describe the points of certain individuals which were very famous for their quantity of milk, it would vary in some points, and these would be such as are applicable to great numbers:—a clean throat with little dewlap, a thin, clean, snake head; thin legs; a very large carcase ribs tolerably springing from the centre of the back, but with a heavy belly; backbone ridged; chine thin and hollow;

loin narrow; udder large, loose, and creased when empty; milk veins remarkably large, and rising in knotted puffs to the eye. This is so general that I scarcely ever saw amongst them a famous milker that did not possess this point. A general habit of leanness, hip bones high and ill covered, and scarcely any part of the carcase so formed and covered as to please an eye that is accustomed to fat beasts of the finer breeds. But something of a contradiction to this, in appearance, is that many of these beasts fatten remarkably well, the flesh of a fine quality, and in that state will feed well enough to satisfy the touch of skilful butchers. The best milkers I have known have been either red, brindle, or yellowish cream-coloured.

"The quantity of milk given is very considerable indeed. There is hardly a dairy of any consideration in the district, that does not contain cows which give in the height of the season, that is, in the beginning of June, eight gallons of milk in the day, and six are common among many for a large part of the season. For two or three months a whole dairy will give, for all that give milk at all, five gallons a day on an average, if the season is not unfavourable, which for cows of this size is very considerable. When the quantity of milk in any breed is very great that of butter is rarely equal. It is thus in Suffolk: the quantity of milk is more extraordinary than that of butter. The average of all the dairies of the district may be estimated at three firkins and three-fourths of a whey of cheese per cow, clear to the factor's hands, after supplying the consumption of the family."

The same high authority, in his official survey of the agriculture of Norfolk, writing in 1804, has declared that the cattle at that time predominant there were Scotch; that cattle in Norfolk of other sorts did not offer much that was interesting; and that the true old Norfolk breed were Middlehorns, of which only one dairy, Mr. Carrington's, at Mileham, then remained in the county. They were red, some not unlike Devons in colour, and as loose and ill-made

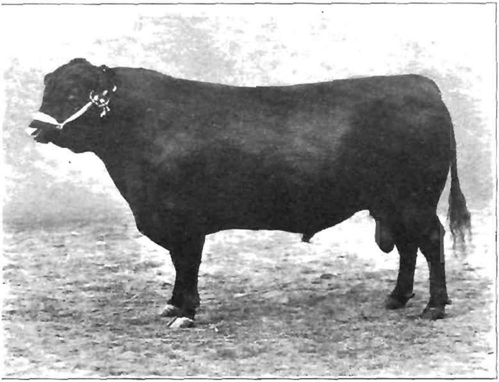
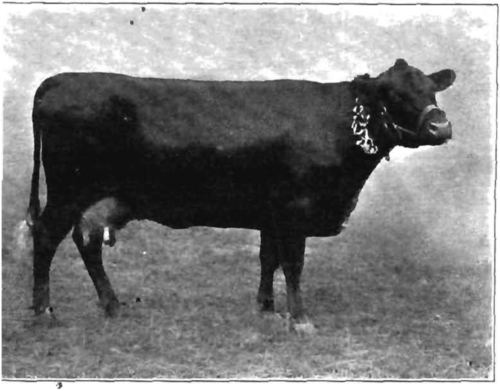


Photo by F. Babbage.

Red Poll Bull.



Red Poll Cow.

as bad Suffolks. He saw one cow 35 years old, which had bred up to the age of 25 years.

Marshall, one of the earliest writers on the agriculture of Norfolk, who resided in that county from 1780 to 1782, when he had the management of the Suffield estates (see "Geology of Norfolk," by Joshua Trimmer, F.G.S., in the *Journal of the Royal Agricultural Society of England*, First Series, Vol. VII., Part II., p. 451), described the cattle of East Norfolk as "small-boned, short-legged, thin-thighed, clean-chapped; the head in general fine, and the horns clean, middle-sized, and bent upwards: the favourite colour a blood-red, with a white or mottled face." He called them Herefords in miniature, except that the chine and quarter of the Norfolk breed were oftener deficient than in the Hereford. They made only about 40 stone, but were easily fatted at an early age, and no better fleshed beasts went to Smithfield. He knew that at different times polled Suffolk bulls had been used for crossing Norfolk Middlehorn herds. The results were increase of size and improvement of form, but he feared that the hardiness and early fattening of the Norfolk breed were impaired by the cross. These remarks, however, throw little light on the origin of the breed, nor do the other references to crossing with cattle introduced from other parts of the country.

Devon blood was extensively used in Norfolk in the latter part of the last century and early in the present century. If it contributed to the composition of the present breed, it certainly did no harm; but we have no direct evidence that the Devon influence was perpetuated in herds which assumed the present distinctive character of the Red Polled breed. As far back as the year 1791 Mr. Coke (the Earl of Leicester) had laid the foundation of his splendid herd of North Devon cattle. Mr. William Blomfield and other Holkham tenants had the breed. Young records the introduction of pure North Devons in 1802, by Mr. Purdis of Eggmere, whose herd consisted of about 40 cows and heifers and 2 bulls, besides Devon oxen for ploughing; Mr. Havers of Melton, too, had a beautiful herd of about 26 Devons.

On the origin of the Suffolk Polled breed, Culley led the way in ascribing it to a Galloway cross, or rather to repeated crosses with the Galloway. He owned that some persons accounted the Suffolk Dun, the prevailing breed of the county, a distinct breed. For his opinion that it was only a variety of the Galloway, he gave his reasons, which do not commend themselves as conclusive; and he waived the question with the remark that whatever their source might be they were at that time "a very useful kind of little cattle, particularly for the dairy." He added that great numbers of them were then employed as dairy cattle in some parts of Suffolk, noted for "the best butter and the worst cheese in the kingdom." The cows are described by him as "like all other deep milkers, very lean, very plain, and very big-bellied," and the average weight of the breed is stated at about 50 stone.

Professor Youatt ("Cattle, their Breeds, &c."), about half a century later, referring to the fame of the Suffolk breed for quantity of milk, has recorded the almost total disappearance of the characteristic dun colour, and the frequency of rudimentary horns, facts apparently indicating the influence of crosses with the Norfolk or some other horned breed. The old Norfolk breed, some of which had pointed and upturned horns like the Devons, and in other characteristics resembling them, but smaller, were sometimes, however, black, although usually red; and he believed that the Polled cattle of both Norfolk and Suffolk owed their hornless character to the Galloway. Some of the Galloways, introduced for grazing, he declared, were retained as breeders.

Later still we have the opinion of Mr. Euren, quoted by Mr. W. J. Moscrop in his "Report on the Farm-Prize Competition in Norfolk and Suffolk in 1886," in the *Journal of the Royal Agricultural Society of England* (Second Series, Vol. XXII., part 2), to the effect that there is evidence showing the existence of Red Polled Cattle in South Norfolk and North Suffolk from a very early period. Mr. Euren suggests the

probability that "the cattle were here from the times of the Danish settlement," and that "both the cattle and trotting horses were here from the times of the early Norse settlement." He claims corroboration of this view in the similarity of an old Hungarian breed to that of Norfolk and Suffolk, and expresses the opinion that they were descended from the polled cattle of the Scythians, mentioned by Herodotus. In reference to a statement that the Galloway origin theory was started by Youatt, it may be recalled that Culley, fifty years before Youatt, was the originator, so far as the publication of the theory is traced. Mr. Moscrop's comment upon Mr. Euren's opinion is in the following terms: "Whether the breed is fairly entitled to the claim of antiquity thus put forward is a matter of less consequence than the acknowledged utility it now possesses, and the two counties are to be congratulated on the conservation and improvement of so valuable a tribe of animals."

Professor Low ("Domesticated Animals," 1845) has pointed out some remarkable contrasts between the Galloway and the Suffolk Polled breed, clearly unfavourable to Culley's view. Robert Bakewell used to say that "a Suffolk beast was like a penthouse, and would do very well if turned upside down." He meant, of course, the old Suffolk Dun of his day, the prodigious milker, before the time of its improvement in form. The fact that the farther we trace back to early descriptions, the more unlike the Galloway is the Suffolk breed found, certainly seems to tell against the theory of the origin of the Suffolk in the Galloway breed.

Mr. Hall W. Keary, of Longlands, Holkham, Norfolk, in his prize essay on the "Management of Cattle" (*Journal R.A.S.E.*, Vol. IX., Part II., 1848) referring to the counties of Norfolk and Suffolk and part of the county of Cambridge as forming the grazing district for the chief supply of beef to Smithfield during the spring months, mentions the polled cattle common some years before in Norfolk and Suffolk,

and known as "homebreds," and adds that in Norfolk the genuine sort were at that time rarely seen, having been so much crossed by the Shorthorn and other bulls. "Their milk," he says, "is poor in quality, and they are, generally speaking, light-fleshed animals, not possessed of great aptitude to fatten, although the beef is said to be of remarkably fine quality. In some parts of Suffolk Polled cows are still common on small dairy farms. They are very hardy, and esteemed for the quantity of their milk."

In the introductory historical notes of the first volume of the Herd Book, various references (by Mr. Torr and others) to the alleged antiquity of the Red Polled breed are unsupported by the names of ancient authorities. Polled cattle, some "sheeted" (white round the middle, with solid coloured fore and hind quarters), were certainly found in Norfolk in the latter part of the last century. We learn (pp. 16, 17) that in 1810 a Norfolk agriculturist was beginning to collect a herd of blood-red polled cattle, and that in 1818 the first advertisement appeared that has been discovered in which "Norfolk Polled" cattle are mentioned. Perhaps the most reasonable inference, from existing evidence and from want of evidence, is that the mingling of horned red Norfolk and polled dun Suffolk cattle produced the present breed at no very remote period.

The foundations taken in the first volume of the Herd Book as the basis of the breed fail to trace to any far distant sources. The Elmham group has records from the year 1849. The American Elmham group is one of its offshoots. The Biddell group of Messrs. Biddell, of Playford, Ipwich, had no recorded pedigrees prior to the starting of the Herd Book, nor are traces of earlier ancestry attempted. In one of its registered tribes a Scotch cross is recorded. The Cranmer group traces to animals selected from good herds in 1861, but without pedigree record. The Eaton group has its early records in the private herd book of Mr. T. W. George, who inherited his father's stock, but there loses its traces of

ancestry. We examine, also, the following groups:—The Easton, Gaywood and Hunstanton, Hammond, Hudson and Savory, Kimberley, West Harling and Melton (crossed with Devon blood), Mileham, Marham and Shouldham, Necton and Pickenham, Oakley (with a Royal show record as far back as 1840), Powell, Stalham, Starston, Stoke (owning an East Norfolk prize record of 1844), Thursford, Troston and Ampton, Monewden, Wolton (tracing as far back as 1848), Wittenham, and lastly the Wilby group. In none of the records of these groups, as searched out and arranged by the well-informed and very competent author of the introduction to the Herd Book, do we find any evidence of connection between the foundations of the present breed and any ancient breed of the same or very similar type. Thus without substantial claim to antiquity, the Red Polled breed stands and can afford to stand upon its intrinsic merits of practical utility.

Lord Sondes (Elmham Hall), Sir Edward Kerrison, Bart. (Oakley Park), Colonel Mason (Necton), Mr. Lofft (Troston Hall), Messrs. Hammond, Hartt, Biddell, George, Savory, Powell, Burgess, Brown, Butler, Smith, Atkins, Sherringham, Edwards, Archer, Freeland, Wotton and Sheppard, the Earl of Kimberley, Lord Rendlesham, Colonel Tomline, Colonel Custance, and Sir Willoughby Jones, Bart., of Cranmer Hall, are mentioned as prominent promoters of the recent rise and progress of the Red Polled breed.

A glance at the history of the exhibition of Red Polled or Norfolk and Suffolk cattle at the shows of the Royal Agricultural Society of England, will help to indicate the last fifty-five years' advance of that breed. The ten earliest meetings of the Society, from 1839 to 1848 inclusive, were held respectively, and in this order, at Oxford, Cambridge, Liverpool, Bristol, Derby, Southampton, Shrewsbury, Newcastle-upon-Tyne, Northampton and York. None of those places being within, although Cambridge was only just outside, the principal breeding-ground, we have to look to the next following

show, in 1849, for the first visit to either of the native counties of the breed. But even in that year the breeds bearing the names of those counties were not recognised in the Society's prize schedule. The competition for the Society's prizes was restricted to separate classes for those breeds only which were regarded as the leading or national breeds—the Shorthorn, Hereford and Devon for many years having that exclusive privilege—and to classes in which all other breeds, as breeds of inferior or only local importance, entered into common contest. The chances of success, consequently, were somewhat haphazard, and it is to the credit of the Norfolk and Suffolk cattle that they frequently wore the rosettes.

In the year 1849, when the Society visited Norwich, the "Blood-red Norfolk Polled bull," bred by Mr. Whytock, and exhibited by Lieut.-Col. Mason, of Necton Hall, took the "premium," as the one prize offered was then called, in his class; and in another class Sir Edward Kerrison's Suffolk bull, bred by himself, was the winner. In 1851, when the show was held at Windsor, the Suffolk cattle of Lieut.-General Sir E. Kerrison and Mr. G. D. Badham, of Thurlston, won all before them; at Gloucester, 1853, the Red Polled cattle competed successfully; at Chelmsford, 1856, they won no fewer than five prizes; at Chester, 1858, and at Warwick, 1859, were prize-winners, as also in 1861 at Leeds, where good animals from the herd of Lord Sondes took honours. The year 1862, memorable as that of the International Show at Battersea, brought them out in classes exclusively for them, and in numerical strength nearly equal to that of the Sussex cattle. In the reports of judges they received special commendation, as showing marked improvement. Size, symmetry, excellence of flesh, and proportion of lean flesh to fat, with good constitution, are particularly mentioned to their credit, and they were said to be qualified to make as much good beef at the least possible cost as any other breed. They had not the advantage of separate classes in the following year at Worcester, but appearing there in the

general competition they were well to the front in the prize-list, and in 1864, at Newcastle-on-Tyne, won all the prizes in the open classes. Continuing to hold their ground in subsequent years, they again had breed classes at Oxford and Wolverhampton in 1870-1; and although the classes were not granted in 1872-3, they won five prizes at Cardiff, and all the prizes in the mixed classes at Hull. At Bedford, 1874, the classes were restored. An important event in the history of the breed is associated with that year.

In that year the first volume of the "Red Polled Herd Book," edited by Mr. Henry F. Euren, was issued, and the position of the breed before the public thereby greatly strengthened. At the national shows, indeed, they had not always separate classes, until the International show was held at Kilburn in 1879, when their apparently permanent position as a distinct and a leading breed was recognised. The classes have been continued annually from that year. The first volume attracted special notice by its unique plan and system of classification, a system which that well-known authority upon live stock subjects, the late Rev. George Gilbert, of Claxton, had advocated as sound and very convenient. The whole of the recognised families of the united breed of Norfolk and Suffolk are classed in 25 groups, each indicated by an alphabetic sign, and comprising (with addenda, p. 170) 233 tribes. Forty herds were entered in that volume. Afterwards herds multiplied fast. Within seven years, 72 were entered in the third volume, 4 of them American herds. The weights of animals shewed a concurrent increase. From 40 to 50 stone was the ordinary weight at the close of the last century, and in 1808 acknowledged by the Norfolk Agricultural Society to be then not commonly exceeded. In seventy years, attention to breed and management had made a great improvement, and in 1878, at the Norfolk fat stock show, a 3½ years old steer exhibited by the Prince of Wales weighed 80 stone. Another steer, under 4 years old, weighed over 111 stone. In subsequent years,

weighed at the Norwich Christmas shows, fat cows have proved above 19 cwt., heifers of 3½ to 4 years old between 15 and 16 cwt., estimated to average from 13 to 14 cwt., two-year-old steers ranging from 13 to 16 cwt., three-year-old steers 15 to 16 cwt. Rates of increase in superior animals are exemplified by steers mentioned by Mr. Garrett Taylor, one shown at Norwich in 1877, when 22 months old, weighing 10 cwt. 1 qr. 15 lbs., again shown when 2 years and 10 months old, weighed 15 cwt. 1 qr. 16 lbs.; another shown at the age of 2 years and 10 months, and again 12 months later, had increased from 14 cwt. 3 qrs. 12 lbs. to 17 cwt. 1 qr. 27 lbs. The prices realised are reported as equal to those given for "Prime Scots." Extreme or rare weights are not here noticed.

The Herd Book, which for years has supplied returns of the milking records of several representative herds, now (close of 1896) comprises 13 volumes, and contains entries of both English and American herds. The registered owners of herds in England, Scotland, and Ireland, number 117, whilst 234 contributors are American owners of Red Polled cattle, from single bulls, for crossing with other breeds, up to extensive herds. One Herd Book thus serves the purpose of both the English Society and the American Club. A few examples showing the capabilities of the Red Polled cattle are here introduced, notice of others being reserved to illustrate the principles of successful management, in the chapter devoted to that subject.

Mr. H. F. Euren, in an article on "Red Polls as Dairy Cattle" (*Live Stock Journal*, special summer number, 1894), gives the following particulars:—One of the Whitlingham cows (Mr. Garrett Taylor's), born in December, 1884, produced her third and last calf on May 11th, 1890, and became incapable of further breeding; yet, when he wrote, she was yielding a considerable quantity of milk and seemed to be nearly as far from ceasing as at the end of one year after calving. In 1893 her record was 5,505½ lbs. in 64 days,

and up to the 15th of May, 1894, a further yield of 1,625½ lbs. These figures show that in about 16½ calendar months, the trial beginning when she had been in milk about 2 years and 7½ calendar months, and ending after she had completed the fourth year of continuous milking, she gave 7,131 lbs. of milk, or a daily average of more than 14¼ lbs. Her yield from June 19th, 1890, to May 10th, 1894, was 28,921½ lbs. of milk, an average of nearly 20½ lbs. or about 2 gallons of milk daily consecutively during 1,411 days. On grass in the spring of 1894, her milk made a weekly total of 101½ lbs., giving 4·7 per cent. of butter-fat under the Babcock test. Mrs. Chevallier's small herd at Aspall Hall, Suffolk, had 7 out of 8 cows and heifers in milk 300 days or more. One heifer, after her first calf, gave 11,517¼ lbs. of milk in 436 days. The highest record in twelve months was 8,507½ lbs. in 306 days, and all but one of the herd gave more than 6,400 each within the year. In Lord Rothschild's herd at Tring Park, the highest record was 9,093½ lbs. in 343 days; and of 12 cows in milk, some only heifers or first-calvers, not more than 3 had a record of less than 4,000, whilst 9 ranged from 4,000 to 6,000, and 9 from 6,000 to more than 9,000 in the year. The records quoted by Mr. Euren are those of entire herds, not of only superior specimens, selected from herds.

In the United States of America, the breed, introduced upwards of forty years ago (the first recorded importation, 1873), but more extensively taken up since the issue of the first volume of the Herd Book in 1874, has made good progress. Although the tendency has been to treat the Red Polls rather as dairy than as beef cattle, at many of the shows, or fairs as they are called, these Polled cattle form very good classes, and it is evident that the polled head, the kindly grazing properties, excellent quality of beef and weight in proportion to the quantity and value of food consumed, are now telling in their favour. Some Red Polled cattle have been exported to New South Wales, within the last few years, to cross with Herefords for the purpose of

producing a breed called polled Herefords. Russia and other foreign countries have also drawn upon the Red Polled breed for crosses to improve their native cattle. In 1869 Prince Leichtenstein purchased from the herd of the late Lord Sondes a number of animals to introduce fresh blood into a breed of Red Polled cattle in Bohemia, understood to be in type exactly like the East Anglican Polls; and after the dispersion of the Elmham herd on the death of Lord Sondes, Mr. T. Fulcher, of Elmham, the agent for the estate, having raised a large herd of his own from purchased representatives of the old Elmham herd, sold extensively for exportation. As many as forty animals have been shipped at one time for the United States.

CHAPTER V.

CHANNEL ISLANDS BREEDS.

JERSEY.—Formerly named Alderney—Known in England early in the Century—Crosses—Increased demand—Acclimatisation—Butter-producing capabilities—The Breed on English dairy farms—More extensive importation—Herds formed—Progress marked by entries at the National Shows—Authorities on Jersey Cattle—Col. Le Couteur—Mr. Le Cornu—Mr. Thornton—The English Herd Book—Introductory History—First and second volumes issued by a Committee as a work of private enterprise—English Jersey Cattle Society founded, 1883—Description of the Breed—Standards of 1849 and 1875 compared—Colours—Milk and Butter—Dairy Records—Weight—Safeguard of purity of breed in the Island—Early English Breeders—Extension in England and Abroad.

GUERNSEY.—Different characteristics of the Guernsey and Jersey Breeds—Dairy Properties—Description of the Guernsey—Native and English Herd Books—English Shows—Advance within the past Twenty Years.

JERSEY.

Under the name of Alderney, indiscriminately applied to the cattle of all the islands of the little British group called the Channel Islands, and to small dairy cattle imported from neighbouring provinces of France, Jersey cows were known well enough in England, quite as early as the year 1812, to enable Quayle, in his "General View of the Agriculture" of those islands, to plead popular familiarity with the breed as an apology for his omission to describe its distinguishing characteristics. At that time, commanding a little more than

the market value of ordinary English dairy stock, they were regarded as the fancy cattle of the rich. Their admirers were found, however, chiefly in the seaward districts of the south of England, inasmuch as cattle born and reared in the genial climate of Jersey, fostered under the master's eye, snugly housed in winter and tethered in summer close to his home, were at first more fitted for a more equal climate in the neighbourhood of the southern shores, than for the colder winter and windy springtide of the central and northern provinces. Culley, about 100 years ago, considered them too delicate for this country. The lack of Jersey bulls long delayed acclimatisation, which could be effected only by breeding pure Jersey cattle in England, and gradually hardening the offspring to English management and English seasons. The cross-bred offspring of imported cows were usually consumed as veal, grazed off as steers and heifers, or, if fair-sized heifers, lost in the common dairy stock. Occasionally a very pretty half-bred heifer might be seen, especially where two or three Jersey cows had been introduced into a Shorthorn dairy herd to colour and harden the butter. If the bull happened to have a little breed about him, the cross might produce very stylish heifers, and even if he were merely a common brute, the Jersey gave smartness to the offspring. The want of size, however, at a time when size was more generally all-important to the grazier than it has been since the demand for small joints made fully as good a market for small as for large carcases, was at first against both pure Jersey cattle and the crosses from them. The cost and difficulty of transit, too, were unfavourable to the extension of the breed.

But in the course of time improved steam navigation and the railways afforded facilities for the exportation of cattle from the islands and their conveyance inland to places at remote distances from the ports of debarkation. The Jerseys were consequently more widely distributed, and as they became better known, their docility and their extraordinary value as butter-producing cattle brought them rapidly into

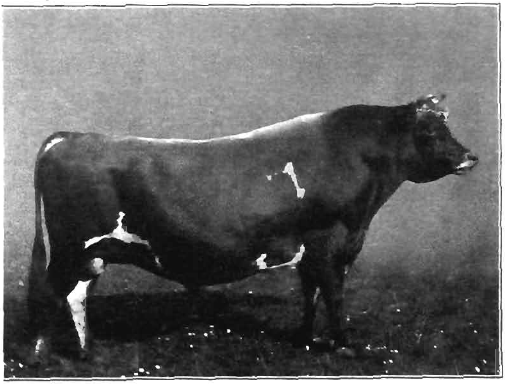


Photo by G. H. Parsons.

JERSEY BULL.

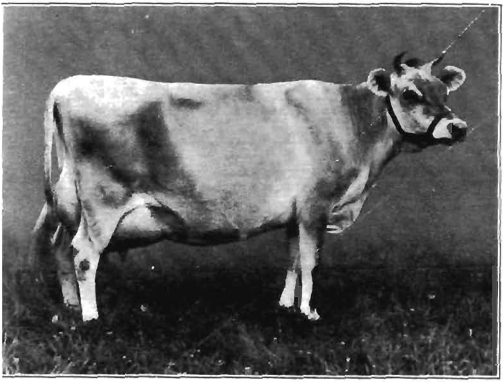


Photo by F. Babbage.

JERSEY COW.

high reputation. Their readiness to adapt themselves to various conditions of climate and pasture was also noticed in the apparently stronger constitution of cattle reared in other countries as compared with the imported stock. The gains might be accompanied by loss, to some extent, of the deer-like character of the island-bred stock. This, indeed, is the case, insomuch that fanciers in the present day frequently obtain fresh stock from Jersey to keep up the distinctive type; but where milk and butter are the main objects, the sacrifice of a little of the island gaiety and slenderness must be allowed as the price of adaptation.

As the breed gradually increased in favour, enterprising men of business, well acquainted with the cattle in their native island, and seeing the prospect of a great demand here, imported extensively cows and heifers for sale, and passing some of them on into the provinces, where they were sold generally at remunerating prices, distributed them over the country, thus, in course of time, popularising the breed. A few herds were formed; some of the leading English breeders obtained choice bulls from the island, and so the Jersey eventually took the important place it now holds among British breeds. Its progress is indicated by the classes at the shows of the Royal Agricultural Society of England.

The first recognition of Channel Islands cattle in the Society's prize list was in the year 1844, when the show was held at Southampton, the very gate of access of the Jerseys to England and centre of its English home along the southern coast. Four prizes were offered; three adjudged to animals sent over from Jersey for exhibition, the remaining one to an English exhibitor. The next appearance of the Channel Islands cattle in classes appropriated to them was at Windsor in 1851. Special classes were again introduced at Salisbury in 1857. The first separation of Jersey and Guernsey classes was at the Battersea International Show in 1862; but at Newcastle-on-Tyne in 1864, Plymouth, 1865, Leicester,

1868, Manchester, 1869, and Oxford, 1870, Jerseys and Guernseys had to compete together in Channel Islands classes. At Wolverhampton, 1871, the separate classes for the two breeds were restored, and the Jerseys have never since lost their privilege of exclusive competition. Comparisons between the meagre representation of early years and the numerous entries of recent years show the rapid advance of the breed. When the Society's International Show was held in Kilburn, in 1879, the total number of British cattle entered for competition was 930, of which as many as 253 were Jerseys, and Jerseys and Guernseys together numbered 292; and at the Society's Jubilee Show at Windsor in 1889, the Jerseys alone numbered 434 entries (bulls 110, cows and heifers 324), making a margin of 7 entries beyond the combined numbers of 222 Shorthorns, 121 Herefords, and 84 Devons, together 427, and an excess of 99 entries over one-fourth of the total of 1,637 entries in the whole of the cattle classes. If to the Jerseys we add the 141 entries of Guernseys, making 575 entries of Channel Islands cattle, we have 30 more than one-third of the total. In 1895 so far north as Darlington, the heart of the old Shorthorn district, the Jerseys having 91 entries were not far behind the prevailing breed on its own ancient ground, thus showing how far, and in what strength, they are distributed over the country. At the south-country shows, of course, their numerical strength is much greater than in the north. Take a Midland show as a fair test. At the Leicester show of the same Society in 1896, the Jerseys, with 130 entries, were first of all breeds in respect of number, followed by the Shorthorns with 127 entries.

The fullest particulars of the Jersey breed are found in several volumes of the *Journal of the Royal Agricultural Society of England*, and in Mr. Thornton's *History*, prefixed as an introduction to the genealogical records in Vol. I. of *The English Herd Book of Jersey Cattle*. In the *Journal* we have, first, in Vol. V., Colonel Le Couteur's "Treatise on the

Jersey, misnamed the Alderney, Cow;" secondly, an article in Vol. XII., Part 2, on "The Breeding Points of Jersey Cattle;" thirdly, Mr. C. P. Le Cornu's prize essay on "The Agriculture of the Channel Islands," Vol. XX., Part 1, 1859; and fourthly, in Vol. XVII. (Second Series), Part 1, in the year 1881, Mr. Thornton's essay on "Jersey Cattle and their Management." The first volume of the Herd Book, containing the same author's *History*, was published in March, 1880.

For some years before the English Herd Book was inaugurated, the want of such a work was felt by many breeders in England. Mr. Thornton had so far foreseen the necessity of registration, that when sales of Jersey cattle were placed in his hands, he gathered all procurable information concerning the cattle, and carefully arranged it in Herd Book form in the catalogues of sales conducted by him. The matter thus collected proved valuable when the time came that a herd-book should be founded. The first public proposal to begin the Herd Book came from the late Lord Chesham, at Mr. Simpson's Wray Park sale, on May 10th, 1878, and, favourably received, was considered at a meeting held on the showground of the Royal Agricultural Society of England at Bristol in July of the same year, and resolutions were passed to the effect that the Herd Book should be brought out by private enterprise, Mr. Thornton being asked to undertake it, and to act as honorary treasurer and secretary. A committee was elected, and the first and second volumes were issued, the first containing, besides Mr. Thornton's very comprehensive history of the breed, with the addition of much relative matter, particulars of 973 bulls, comprising the earliest sires traced in the known pedigrees of Jerseys in England. Prize lists and particulars of sales appended, made the volume complete so far as space permitted; but the cows and heifers, crowded out, were relegated to the second volume, which, issued two years later, contains the pedigrees of 321 more bulls and 850 cows, with their offspring entered below their pedigrees. Supplements containing lists of calves born, prizes won, and particu-

lars of sales, followed, and on July 10th, 1883, the Board of Trade granted a Certificate of Incorporation of the English Jersey Cattle Society, carrying on business at 7, Princes Street, Hanover Square, London, who died in 1908, the offices of editor and secretary devolving upon Mr. Thornton. The subsequent volumes of the Herd Book have been issued by the Society. They contain a mass of valuable information, comprising notes of dairy management, dairy records, and other items which make the work a model Herd Book. The English Jersey Cattle Society's London offices are now at Bloomsbury Square, W.C., and the secretaries are Messrs. Hammond & Craufurd.

A description of the breed, comprised in a standard of points, with two illustrations, designed to show respectively the type and characteristics of the mature male and female, as decided by a committee of distinguished breeders in the Island of Jersey, and confirmed by the Board of Management of the Royal Jersey Agricultural Society in 1849, is reproduced in the second of the above-mentioned notices of the Jersey in the Royal Agricultural Society's *Journal*. Both animals, as engraved, are parti-coloured, but nothing is said about that which is now understood when colour is mentioned,—the colour or colours of the entire coat of hair. The light colour encircling the muzzle, and the colours of the hide, horns, and ears, are mentioned, but nothing is prescribed concerning the colour of the coat. The bull has a scale of 33, the cow of 36 points. Some of the points are for pedigree, growth, general appearance and condition, the rest are descriptive of the ideal male and female in detail. The head in both sexes should be fine and tapering, that of the cow or heifer also small; the bull's forehead broad, cheeks of both small, throat clean, muzzle fine and encircled with a light colour; nostrils high and open, horns smooth, crumpled, not too thick at the base and tapering, tipped with black; ears small, thin and of a deep orange colour within; the eyes of the bull full and lively, of the cow or heifer full and placid; the bull's neck arched and powerful, but not too coarse and heavy, the cow's

straight, fine, and lightly placed on the shoulders; the chest of both broad and deep and barrel hooped, broad and deep, well ribbed "home," that is, having but little space between the last rib and the hip; back straight from the withers to the top of the hip, and straight from the top of the hip to the setting-on of the tail, which should be fine, hanging at right angles from the back down to the hocks; the bull's hide mellow, the cow's thin, both "movable, but not too loose," of a good colour (not specified), and covered with fine, soft hair; fore-legs short and straight, the cow's also fine; the bull's fore-arm large and powerful, and the bull's and cow's alike swelling and full above the knee and fine below it; hind-quarters of both, from the hock to the point of the rump, long and well filled up; hind-legs short and straight (below the hocks), squarely placed and not too close together when viewed from behind, with bones rather fine, and not to cross in walking; hoofs small; the cow's udder "full in form, *i.e.*, well in line with the belly," and well up behind, teats large and squarely placed, wide apart; milk-veins very prominent. This, in substance, and as nearly in the same words as possible, in repeating, *currente calamo*, matter stiffly tabulated, is the approved description of model Jersey cattle nearly half a century ago. The standard of 1849 was taken from the first drawn up by the Society in 1834, and amended about 1845; but departing from the original plan of giving a plurality of points, more or fewer according to importance, for each part, it gave one point for each, regardless of comparative importance. After two or three further revisions, a radical revision, restoring the original plan of a plurality of points, differing in number for various parts, occurred in 1875. Before that year certain fancy properties, such as black tongues and black tails, had come into fashion, and the American and English demand for whole colours had partly diverted attention from the main merit of the breed—its extraordinary value for the dairy. The new ratio scale gave 100 points for cows and 100 for bulls. Attention was rigidly redirected to practical excellence, exclud-

ing merely fanciful details. Most of the leading characteristics, however, were described with but little alteration from the standard of 1849, although the number of points differed. The following amendments seem sufficiently important to be noticed:—For "muzzle fine," the words "muzzle dark" are substituted (for both sexes), and an addition to the description (of both) is—"withers fine, shoulders flat and sloping; hips wide apart and fine in the bone; rump long, broad and level; back broad across the loins;" and instead of the division of the top line of the back into two parts, each straight but with a break at the hips, we have—"back straight from the withers to the setting-on of the tail;" and for both sexes—"hide thin and mellow;" and instead of a "good" colour, a "yellow" colour of hide. Colour of the coat of hair, even in this recent standard, is omitted. To the objection to "crossing" hind-legs, a "sweep in walking" is added, and description of the arm is the same for male or female. We have also the addition of "yellow teats," and in the scale of points for bulls five points are allowed for nipples squarely placed and wide apart. In the standard of 1849 this important token of the male animal's fitness for his place at the head of a dairy herd had been overlooked.

A few words upon the peculiar colours of Jersey cattle, which the compilers of the standards have omitted to place in the list of characteristics of the breed, are necessary here to make a description complete. Unlike our English breeds, which have black or red of a definite kind, and compounds of one or the other with white, the Jersey cattle, like those of several breeds found upon the continent of Europe, from France and Switzerland to the Black Sea coasts of Russia (such as the Kuban and Tchernomor breeds), have colours composed of more elements, and more liable to vary under changes of the year's seasons than the English colours of simpler composition. A characteristic of colours of the Jersey class, in all those widely distributed breeds, is the pale edging encircling the dark muzzle. Many varieties of this

class exist; tawny red, yellow, pale fawn, lemon fawn, smoky fawn, grey fawn, silver grey, brown, dun and black, wit frosty grey varying from more to less or less to more of the silver mixture as the seasons change. Perhaps in the climate of Jersey, and in other climates more equal than that of England, variation with the seasons is not so strongly marked as in England. The term "whole-coloured" in the description of Jersey cattle, does not preclude many shades of fawn, yellow, or red, with silver grizzle or with clouding of black; but any separate white, in large or small proportion, at once makes the animal "broken-coloured." The liability of most of the Jersey colours to vary with the changing coat of the animal has brought into use the common rule of describing animals simply as "broken-coloured" or "whole-coloured," so as to avoid unnecessarily causing doubts of identity, say, in the case of animals entered in catalogues for sale or for show. A cow correctly described as fawn might appear, after the lapse of a very few weeks, as grey, or *vice versâ*. Mr. Le Cornu (in 1859) briefly described the Jersey in these words:—"In form the Jersey cow is deer-like and small in size; the colours mostly prized are light red and white, the brown and the fawn. Brindled specimens are rarely seen; they are not at all valued, and may be purchased extremely cheap."

With regard to the important dairy properties, the same authority states that a good cow on the average gives fourteen quarts of milk daily, yielding eight or nine pounds of butter in the week, and that instances of cows giving twelve or even fourteen pounds of butter are common, but of course above the average. He introduces a table of the differences between Jersey and imperial weights and measures, showing that 104 lbs. Jersey are equal to 112 lbs. English (avoirdupois), and 110 Jersey gallons, equal to 100 imperial gallons. These statements, published before the English and American fashion for Jersey cattle had disturbed the quiet of the Island and created a continuous effort to meet the demand whilst maintaining

the native herds in their excellence, may be taken as fairly indicating what the breed can do at home under normal conditions. In America some extraordinary records have been reached and beaten, until it is difficult to say what the Jersey cow can not be made to do under full pressure. In England, also, some great records of whole herds are extant; but some English herds, from change in the quality of food and system of management, have gained in size of frame and in flesh, proportionately losing in milk and butter, yet are still very good for dairy purposes; so that it is not easy to select a fair English average record. Without seeking extreme instances, we may take the average of 20 cows selected from the winners in dairy tests at some of the principal English shows of the last few years, mostly those shows at which the milk and butter competition prizes offered by the English Jersey Cattle Society were awarded. The average weight of one day's milk by those 20 cows was 37 lbs. 4¼ ozs., and the average weight of butter from that milk 2 lbs. 2¾ ozs. The list includes first, second, and third winners, none making an extreme record. The test at a show, we must remember, great as it may be, is presumably always unfavourable to the cow; for anyone who knows the sensitiveness of a dairy cow is aware of the uncertainty of a test taken within a few days after her removal from home. In this cows vary much, some scarcely showing any effects of disturbance at the end of a journey, others giving reduced quantities of milk for days after.

The milk of Jersey cows is not easily tested by sample. On account of the larger size of the butter globules of this than of any other breed of the British Islands, the cream rises quickly. Three samples, drawn at one time from different depths of the pail of milk fresh from the cow, have been found to differ very considerably, the proportion of butter-fat being greatest in the uppermost, and least in the lowest samples. For this reason also, it has been said (whether truly or otherwise) the milk of two or three Jersey cows,

mixed with the milk of other dairy cows, not only causes the cream to rise faster than in the milk of ordinary cows alone, but brings a larger quantity of cream to the surface, the larger globules of the Jersey milk attracting and carrying up with them the very small globules which, but for the attraction and buoyancy of those of the Jersey milk, might never reach the floating cream. Some dairy managers, on the contrary, do not approve of this practice of mixing. The specific gravity of Jersey milk is somewhat less than the average of milk in general, which a competent authority has reckoned at 10⅓ lbs. to the gallon; perhaps 10 lbs. or very little over to the gallon (imperial weight and measure), is as near the average of Jersey milk as we can have. The richer the milk is in butter-fat the less its specific gravity.

The weight of the full-grown Jersey cow when in milk ranges between 800 lbs. and 900 lbs. (English), or about 400 less than the weight of an ordinary Shorthorn in milk. But it is of course increased when the animals are bred and reared upon the rich alluvial pastures of some of the English valleys.

In the Island of Jersey the purity of the breed is preserved by statutory prohibition of the importation of live cattle.

In England, the oldest herd in existence when the first volume of the Herd Book and introductory history appeared in 1880, was that of Lord Braybrooke, at Audley End, Essex, founded in 1811, frequently represented by winners at the Saffron Walden (now the Essex County) Society's shows, and noted for its excellent dairy records. The late Mr. Philip Dauncey, of Horwood, Buckinghamshire, bought his first Jersey in or soon after the year 1821, and became the most prominent leader of the Jersey breeders in England. His prodigious butter records drew attention to the capabilities of the breed, and his herd was recognised as bearing the impress of a true breeder's judgment and taste. His sale, too, in the autumn of 1867, realising an average of £41 10s. 6d. per 90 head, 54 cows averaging £47 15s. 8d., and 12 heifers £50 15s., at once placed the Jerseys upon the footing of an established

reputation. New breeders and new herds multiplied rapidly, and the British colonist and the foreigner competing for the choicest specimens distributed them, often at great prices, to all quarters of the world.

GUERNSEY.

Widely differing from the Jersey breed in characteristic details, yet so nearly like that breed in a rough general view as to leave no doubt of original relationship, and known to have been occasionally connected by mutual crosses at a not very remote period, the breed belonging to the sister island of Guernsey holds now a recognised and respectable place among British dairy cattle. Although not so generally as the Jersey made the pet of the villa paddock or the ornament of the park, it is the formidable rival of that breed in claim upon the attention of the dairyman and the farmer whose living depends upon the profits of his business. The cow-keeper who thus relies upon the produce of his stock to pay his rent and give him a margin for the maintenance of his household, has to consider what he can make of each cow whilst in milk, and what, eventually, when she fails to breed or becomes superannuated for the dairy. If he can make something considerable by each out-going cow, he can fill her place with a very little addition to her value to the grazier, or, at a small cost, can soon make a good thriver worth as much as a dairy cow, and so virtually exchange the one for the other. This in effect is equally important to him whether he rear his own heifers or purchase to fill the blanks. It is a substantial part of the returns required to make his business profitable; and in this the Guernsey has the advantage in competition with the Jersey. Another point in her favour is that she gives on an average more milk than the Jersey, perhaps about proportionate to her greater size and to the consumption of food necessary to produce it and to sustain herself. This larger quantity of milk is rich in butter

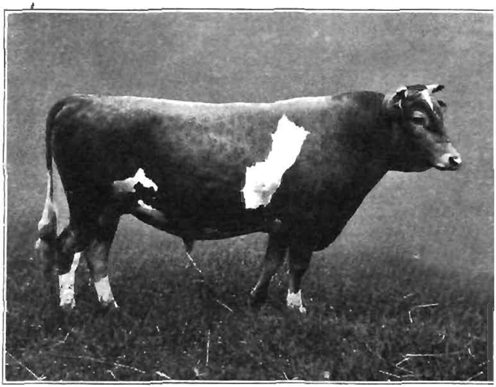
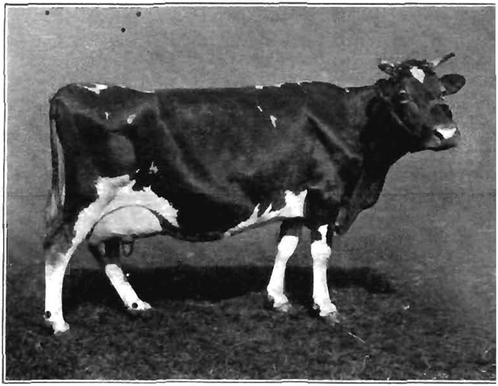


Photo by E. Babbage.

GUERNSEY BULL.



GUERNSEY COW.

fat, reaching sometimes 5½ per cent., and showing a very high average somewhat below that percentage. Her milk is exceedingly rich in colour. The salesman, commending a Guernsey cow, will declare that her milk is "as yellow as paint," and that "she will colour all the butter in your dairy." An authority upon both Jersey and Guernsey cattle has reckoned one Guernsey as equal to two Jerseys for the object of colouring butter from a given number of cows of other breeds. Here again, however, the question suggested in regard to the Jersey again arises, whether the mixing of milk is good, harmless, or bad practice. Anyhow, with her unquestionably large produce in milk and butter, and more size of frame, and finally weight and value of carcase, the Guernsey, for certain purposes, has advantages over the spruce little Jersey.

The weight of the Guernsey cow in milk ranges from below to above 1,200 lbs. In dairy contests, when prizes are offered for the competition of various breeds in classes for cows between 900 and 1,200 lbs., and cows over 1,200 lbs., Guernseys are eligible for both classes, so that this breed comes into tests against both large and small breeds of dairy cattle. The long and extensive use of oxen for labour in the island of Guernsey probably tended to the iucrease of size and strength by selection with a view to the breeding of powerful oxen. The beef, from its yellow fat called "yellow beef," is by the Islander much preferred to the foreign "white beef," as the imported meat is contemptuously named.

Light-fleshed when in milk, the Guernsey has the mellowness and elasticity of hide which denote a kindly thriver. The hide is thin. The hair, fine and closely set, is not profuse in quantity like that of breeds needing longer hair for colder climates; but under acclimatisation in colder countries than its own, becomes considerably increased within a very few years. The deep yellow dye of the milk, and of the fat, as seen throughout the carcase when the animal is turned into beef, is so thoroughly in the system as to colour the skin,

showing itself inside the ears and elsewhere, and found on closer examination in all parts of the hide.

The colours of the Guernsey are not so widely varied, nor severally so variable with the seasons, as those of the Jersey. In fact one description of the colour of an animal would be equally applicable through the year. There is a light red, or a yellow, with white markings, commonly of considerable extent, the red of different individuals showing all gradations of shade, from red to yellow, and the yellow again toned off to fawn colour, including in its varieties orange fawn, and lemon fawn. The head is longish, but not large, the face not cut out and refined like that of the Jersey type, yet by no means wanting in distinctive character. The horns are rather longer than the Jersey's, yet still small, and turned upward, not crumpled, and are of a yellow colour. The ears small, thin, with fine hair, and within, as already stated, showing the yellow characteristic of the breed. The nose is usually light-coloured, yet a black muzzle is admissible, and, when it appears, has the margin of light-coloured hair like that of the Jersey, and continental breeds with colours of the Jersey class. The neck of the cow is of feminine character, long, light, and nicely tapering towards the head. The fore-quarters are light in proportion to the depth of frame at the middle and udder. The milk veins are large and prominent. The bag is large, and should be broad and square, carried well forward and not fleshy, with wide-set teats; but in past years these particulars of the bag were not so often realised as they have been since more attention has been paid to its form and development. The top line of the animal is, or should be, straight; the shoulders are fine and the hind-quarters capacious, giving, with the proportionately smaller fore-end, the wedge-shape of a true dairy breed.

The Guernsey has a Herd Book in its native island, and one established many years ago in England. At several of the English shows it has latterly appeared in great strength, particularly in the south of England, where from 80 to a 100

Photo by C. Reid.

British Holstein Bull.

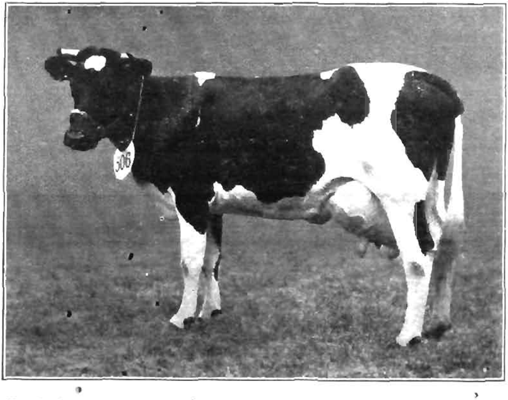


Photo by F. Babbage.

British Holstein Cow.

good specimens often (sometimes a larger number) are mustered in the showyard. The principal shows at which it is constantly seen in force are those of the Royal Agricultural Society, the Bath and West of England Society, and Southern Counties Association, the Royal Counties, the Essex County, the Oxfordshire, and the Dairy Shows.

BRITISH HOLSTEINS.

Dutch cattle flourish in every part of the world, from Sweden to New Zealand, from Arctic Russia to China, from Japan to America; but in Great Britain, where the breed is referred to so early as 1681, there was a danger that their purity would become impaired, as, since the importation of cattle into this country was prohibited, comparatively little attention was, until about 1910, paid to their breeding. The high reputation of the breed with respect to its heavy milking capacity had induced a number of prominent agriculturists to import specimens, and when this could be done several fine herds were in existence. The formation of the British Holstein Cattle Society, in 1909, removed the possibility of the fine herd becoming extinct, and the work accomplished has caused it to be recognized, not only for its heavy milking properties but also as being very profitable, hardy and economical. With the great demand for milk a breed that is admittedly superior in this respect was sure to gain many supporters. In 1911 classes were given for the British Holsteins at the Royal Agricultural Society's show, and in 1913 at that of the Highland and Agricultural Society, while various county societies also offered prizes for them. Excellent prices have been obtained at various sales. In 1914, at a sale of Holstein cattle imported from Holland by the British Holstein Cattle Society, an average of £253 3s. 1d. was realized for fifty-nine head, highest price £588, total of sale £14,926.

CHAPTER VI.

CROSS-BREEDING.

Special Objects of Crossing Distinct Breeds—Temporary Advantages to be gained by Judicious Crosses—Tendency to Reversion in Subsequent Generations—Possibility of Permanent Good from a Cross—Alloy in Best Improved Breeds—Formation of New Miniature Breeds—Major Barton's Experiments—Crossing on American Ranches — "Grade-Breeding" — Various approved Crosses.

The practice of systematic cross-breeding for special objects is often attended with substantial advantage. When ruled by sound judgment it enables the breeder to effect the temporary union of desired properties separately characteristic of different breeds: so to blend the distinguishing chatacteristics of different breeds as to produce a temporary new type. For special use, animals more exactly adapted to the purposes for which they are required than the pure-bred animals of either parent stock are thus supplied. Conflicting influences, however, do not long submit to compromise. A struggle between them for mastery ensues; and the results, in succeeding generations from half-blood animals interbreeding, are variations from the character of the animals bred immediately from the meeting of the two breeds in a direct cross. Some descendants revert more to the one, the rest to the other, of the parent stocks; whilst in not uncommon instances we may notice something like a reversal of the first compromise, and instead of the most desirable properties of the two breeds being either blended or gathered together, the mixture

tends to the destruction of all that was good on either side. But this admission must be guarded by a warning. The popular notion that nothing of permanent good can come from a cross is fallacious. To get the mind clear of it is important. Our most highly improved breeds all contain alloy. Much weeding-out may be necessary; but the select descendants blended breeds compose new breeds which eventually supersede the old, when enlarged capability of usefulness becomes fixed as a constant inheritance.

We are here, however, considering direct and systematic crossing for the production of animals to answer particular purposes, and not with a view to lasting effects. When the animals thus produced have served the purpose for which they were bred, they disappear. Some steers, and heifers without issue, bred and reared for the grazier and the butcher, pass into the national food supply as beef; some at earlier age become veal; and those heifers bred and reared for the dairy, have offspring which either live only to be consumed as veal or early beef, or are lost in the common herds of cattle without distinct breed. The favourite blue-greys of Cumberland, bred directly from the Shorthorn (most frequently the white Shorthorn) bull and black Galloway polled cows; crosses of the Shorthorn and West Highland, Shorthorn and Ayreshire, or Guernsey, or Jersey, Hereford and black Welsh, Polled Aberdeen-Angus upon various breeds, and, for great carcases of prime beef, Shorthorn upon Aberdeen-Angus, are well known examples of the direct combinations of two distinct breeds.

Cross-breeding is also occasionally practised for more lasting objects, sometimes even with the idea of either modifying an established breed or founding a new breed. The experiments of Major Barton, of Straffan, in Ireland, in the direction of the establishment of a modified miniature Shorthorn by taking, as the foundation, the Dexter Kerry cow, and super-imposing many consecutive crosses of registered Shorthorn sires, eventually crossing with a bull so bred

a pedigree Shorthorn cow, are exceedingly interesting, and appear to be, so far, quite successful. Of course, in a case of this kind, careful selection is requisite, or the animals would be either too large or of mixed sizes, and would lack the character desired. Miniature black polls, similarly bred, but with the substitution of Aberdeen-Angus for Shorthorn bulls, are also illustrations of the success of this system of cross-breeding in Ireland. In America, half-bred and "grade" Herefords, the latter term meaning cattle bred from Hereford sires used in unbroken succession upon alien stock, mostly the common cattle of the States. Half bred and "grade" Shorthorns are almost ubiquitous throughout the ranches of many of the great beef-producing States, as also in the dominion of Canada and in South America. Aberdeen-Angus crosses are likewise in high favour in the western world; and in some of the vast wild regions of the American continent, where the search for fresh pasture and for water requires cattle of great activity and endurance, and where a little modification of the size of frame is no disadvantage, the Devon bull has won an excellent character among the ranchmen. The uniform character and red colour help the demand for them, as being associated with good quality of beef and profitable carcases; and where horns are found inconvenient, on cattle for rail or shipment, Red Polled sires are coming into favour. The Sussex breed, for scale and strength, should suit some ranches. Devon bulls, in Texas, according to an American authority quoted by Mr. Sinclair in the Devon "History," cross admirably both with the native cattle of Texas and with "grade" Shorthorn cows. In different British colonies one or another of our heavier English and Scotch breeds finds favour according to the character and trade of the country. In Queensland, whilst the heavier breeds have many advocates, the Devon is not without powerful support, and the calculations of its admirers that as much Devon as Hereford or Shorthorn beef can be produced to the acre, the extra number of cattle which an acre can maintain, when Devons are kept, making

up for the lesser weights of the animals severally. It is also said that the Devon cross upon the Shorthorn is excellent for increasing the proportion of lean flesh to fat.

In the West of England, about one hundred years ago, an ingenious although a somewhat eccentric man, Mr. James White Parsons (described by Garrard as a distinguished breeder of Devons), conceived the idea of moulding a new breed out of a compound of North Devon, French, and Indian elements. Whether the Indian was the Zebu, or some other kind of Indian cattle, and what French breed he used, he did not tell in a circular dated October 10th, 1804, when after several years employed in working out his crotchet he invited his friends and the public to inspect a pair of grown-up specimens, male and female, exhibited at the Spa, St. George's Fields, London. The printed circular, or manifesto, as it may be called, a facsimile of which is in the writer's possession, is in an artificial style of forced facetiousness, which suggests the impression that it was the composer's habitual manner of self-delivery, rather than the result of a single and spasmodic effort to be playful. Whether, however, this document was his first and last presentation of himself in the character of a man of mirth, or whether his powers of perseverance were divided between the task of evolving a new breed and that of laborious sprightliness, the matter, after ninety-two years, has lost its effervescence, and is in these days rather flat reading. It gives very little of fact in favour of the new breed, for beyond the breeder's own assertion that the calves at the age of one month are "as fat as quails, and worth three guineas a-piece to kill," we have nothing but his own confident anticipations, the fulfilment of which he considers beyond doubt, that "hides, flesh, milk, and tallow will be of a superior quality and value." Whether the "breed" failed in competition with older breeds, or died out contrary to its deservings, because it had come into the world before the days of railways and cheap newspapers, it is gone, and the prescription left by its founder is too vague in respect of two

of the three components to enable posterity to repeat the experiment with any certainty of being on precisely the same lines. If all the founder's expectations were realised, still there is a great difference between excellent immediate results of the blending of two, or more than two, distinct breeds, and excellent results in perpetuity from the same combination. Perhaps we shall not be far wrong if we accept, as the lesson of this now long-lost "improvement," a caution against counting upon constancy of transmission until the new breed, separated from its diverse sources by many generations, has ceased to manifest a tendency to analyse its own composition and revert to the constituent parts.

CHAPTER VII.

MANAGEMENT.

SECTION 1. GENERAL MANAGEMENT.—Importance of the Rudiments—Improvement beginning with Management applied to Newly Domesticated Cattle—Systems must suit Objects and Conditions—Milk—Beef—Treatment adapted to Land—Illustration—A few General Rules—Herds least advanced from the Wild State—West Highland—Welsh—Ox Labour of Past Days—Management adapted to that Object—Messrs. Macdonald and Sinclair's Hereford History—Duncumb's Testimony—Arthur Young—Sussex Cattle of last Century—Pail Feeding—Remedies for Calves—How to Use the Horn—Danger of Over-Feeding Calves—Treatment of Growing Calves—Dry Food—Polled Cattle and Hereford Histories—Systems of Management Described—Aberdeen-Angus—Hand-rearing *versus* Suckling—Straw and Turnip System in Scotland—Shorthorns in the North-East of Scotland—South-West of England—Norfolk—Hereford Herds—Devons—Feeding for Show—"Living" Milk—Showing Cattle Privately—Rules of Assortment, &c.—How to Lead Out—Feet of Cattle—Directions for Treatment—Cattle Travelling—Railway Conveyance—Sundry Dangers to Stock—Yew Poisoning—Breeding for Sex—Freemartins—Period of Gestation—Sex in connection with Length of Period.

SECTION 2. DAIRY MANAGEMENT AND RECORDS.—Circumstances rule the Treatment—Examples—Lord Braybrooke's Jerseys—Mr. J. F. Hall—American Records—Kempton Park Trials—Mr. Dumbrell (Note) on Proportion of Jersey Milk to Cream and Butter—Mr. Thornton's R.A.S.E. Paper on Jersey Management—Jerseys in England—Details—Age for Heifers to Breed—Weaning Calves—American Tests of Breeds—Jerseys for Butter—Ayrshires for Milk and Cheese—Excellent Average of Dr. Sturtevant's unforced Ayrshires—Pedigree Shorthorn Dairy Herds and Records in England—Red Polls—Whitlingham and

Necton Hall Dairies — Devon Dairies—The Dorset Letting System—Mr. A. Watt's Tests of various Breeds—Difficulty of Fairly Testing different Breeds—Usefulness of Trials—Importance of Ventilation, Drainage and Light—Kerry and Dexter Dairy Breeds.

Section I.—General Management.

In the economy of the domesticated herd, knowledge of the cardinal rules of feeding and caretaking, and discretion in the application of that knowledge to daily practice among the cattle of all ages, are among the very first prerequisites of success. This being the case, even with regard to cattle of those races which are least removed from their natural character and natural conditions (for when once brought under the hand of man they are more or less subject to the influences of new circumstances), it becomes so with ever increasing force as the breed ascends the scale of improvement. The better the breed, the better should be the land and the better the management of the cattle upon the land; and the better the quality and condition of the land, the better the breed kept upon it. A highly improved breed is much sooner deteriorated by neglect or ignorant management, than a breed which has undergone but little improvement. The reason is not far to seek. That which we call improvement, the alteration of animals from their original fitness to live under natural conditions, to a state of adaptation to domesticated life, with the enlargement of their capacities to serve the purposes of man, is effected under systems of management; and according to the direction in which the variations induced by new conditions are turned, by means of selection and management, breeds are developed to suit one or another purpose. In connection with the principle of selection, management, therefore, is at the very source of breed-making; and for the maintenance of properties developed by selection and management combined, continued intelligence and painstaking are fully as necessary

in management as in selection. Without efficient management, the best of breeds degenerate; and before hereditary degeneracy begins, deterioration of the properties and powers of the animals first mismanaged makes them individually unprofitable; then, unless the retrograde change be arrested, and restoration effected by recurrence to proper treatment, the lessened capability of usefulness is transmitted from parent to offspring, and the excellent characteristics of the breed are lost.

It is evident that no one system of management can be devised to suit all cases. The system favourable to the heaviest growth of beef is unfavourable to the largest yield of milk; that which forces an extreme quantity of milk is unfavourable to richness in the quality of the milk; and again, whilst the quality of the milk is under consideration, we must bear in mind the object of the dairy for which the milk is required, whether butter or cheese be the principal product. Selection of the cow, and of her food, must be regulated by these considerations. If the sale of new milk be the chief business, quantity is of course desirable; but customers have to be suited, and the recognised standard of quality must be observed on pain of prosecution, and the clearest innocence of recourse to either the pump handle or the illicit blending of twelve-hours-old milk, lightly skimmed, with the genuine milk fresh from the cow, may not avail to shield from conviction the dairyman whose sample fails in quality under the decisive test. Whether the undue percentage of water has come directly from the tap or the well, or indirectly through the cows, the result all the same is a fine with costs. Then, further, in the business of beef production, there is the management necessary for the rapid development of "baby beef," and the variation required for the raising of store stock to be fed off at maturer age. And whatever the object be, milk, butter, cheese, beef, or a combination of more than one of these objects, the treatment of the cattle must be made to suit the sustaining capability

of the land. An instance of this may be taken from the western coast of the county of Cumberland, as recorded by the present writer in an essay upon "The Management of a Shorthorn herd" in the *Journal of the Royal Agricultural Society of England*, vol. xvi., s.s. part 2. Several neighbouring farms, two or three of them family property and others rented of neighbouring proprietors, altogether comprising about 900 acres of enclosed land (100 acres arable), with an unlimited right of fell pasturage, were in 1880, occupied by Mr. Henry Caddy, an agriculturist of large intelligence and enterprise, who had succeeded his father at Rougholm in the narrow valley of the Esk, between the range of green, bare, pastoral hills, of heights up to about 1,500 feet, and the sea. The stock consisted of about 130 or 140 head of cattle, 17 horses, 1,000 Herdwick and 100 cross-bred sheep. The elder Mr. Caddy had kept a herd of first rate dairy Shorthorns, shapely animals with some breed about them, such as Cumberland can abundantly show. His son, still making the dairy his main object, paid more attention to pedigree, and had a very well-bred herd. The system always followed by Mr. Caddy, senior, who warmly maintained that it was the only one for that district, was to rear his cattle on very little food, and allow his breeding cows only meagre rations during the winter. This his son believed to be a mistake, and therefore, on coming into possession of the property, tried the effect of liberal rearing and feeding his cows well in winter. The experiment, after ample trial, was abandoned in favour of the old system. The higher artificial feeding of the housed animals had given an impetus to the growth of frame and muscle which the poor land could not maintain. The winter feeding of the calves and cows must be therefore brought down to correspond with the low summer feeding power of the pasture, or else the latter must be assisted with artificial feeding, continued, with some reduction of the daily allowance, but still very costly, from the time of turning out in spring to bringing into the buildings again in autumn. The pecu-

liarity of such land, of what is termed the "sour" kind, is that whilst it cannot maintain the condition of animals made fat by artificial feeding, in summer it can put good flesh upon animals turned out in a lean state after a winter of poor fare, stimulating them to astonishing progress during the grass season.

A few general rules may be laid down as applicable to management under all conditions. The laws of life and health must be carefully observed; the tempers, dispositions, habits and constitutions of animals individually studied; sources of danger sought for and removed; forethought exercised on all points, so that provision is made for every event likely to occur, and, still better, for more remote possibilities also. Thus the importance of light, pure air and pure water, will be impressed upon the mind of the intelligent and attentive manager, and recognised in his system. The vitalising power of direct sunlight will not be forgotten, either in its effects in stimulating the growth and thriving of stock, or in its restorative influence in cases of sickliness. The ventilation of buildings, whilst thorough, will be regulated to the exclusion of injurious draughts upon the animals, whereby chills are received, and those chills may prove to be the beginning of serious maladies. "Only a cold," was the apologetic account of his ailment, by the patient of a famous rough diamond of the medical profession, who retorted, with an accompanying epithet more forcible than polite, "Would you have the plague?" The drainage of yards and buildings, the removal of all matter, solid or liquid, causing really offensive and injurious smells, and the cleanliness of the skin and hair of each animal, will be looked after by the efficient manager. The appetite of each animal will be watched, as far as may be practicable, both with a view to the treatment of that particular animal for profit, and to detect any approach of illness. For the latter reason, too, the eyes, ears, noses and coats of hair of the herd will be so under quick-sighted observation (without, in a practised manager, the necessity of examining each

animal singly, all over, every day), that a dull eye, an ear hanging back and cold to the touch (the root of the horn being also cold in most cases), a dewless muzzle, or prickly hair, may give timely warning of something amiss, and the ailing animal be put under proper treatment at once. Delays are often dangerous. The least lameness, also, in any one of the herd, will be detected at a glance, by the eye used to take in everything on seeing a herd; the sore, soft cough, will be instantly distinguished from the brisk "hoose," or strong, clear cough, and will draw solicitous attention to the animal from which it comes, and the habitual cough, strong or weak, distinguished from the mere clearing of the throat of a bit of hay or chaff, or something picked up in the grass. Then the manager will see that the animals are severally and kindly dealt with by the herdsmen, and will himself go among them much, to ingratiate himself with them, and in so doing will detect any timidity caused by harshness on the part of any one of the servants under him, and trace it to the offender. The old adage—"Laugh and grow fat," is figuratively applicable, for there is nothing more certain in regard to the management of stock than that disturbance and discomfort interrupt the processes upon which profit depends. Whether it be flesh-making or milk, growth of frame or healthy and profitable pregnancy, contentment, a feeling of comfort and satisfaction, is half the battle. In stall-feeding, the winter management of stock in-doors, or the treatment of those kept under cover upon dry or green food supplied to them for any purpose, regularity in the time of feeding and in the sufficiency of rations dealt out, is of immense importance. The animals know to a nicety how the time goes on, and become restless, discontented, and more or less sour in their general temper, if not fed regularly.

In herds nearest the wild state, as already hinted, some of the more primitive methods of treating cattle may still suffice; although since civilisation has extended more or less to the remotest regions of the British Islands, we may hope

that the rude slovenliness which disgraced humanity in some secluded districts in the last and preceding centuries, is nowhere now to be found. Still there are places where the cattle, but that they are kept in a state of subjugation so as to be sufficiently under control for transmission to distant parts, and for introduction at fairs or markets, are mostly taking care of themselves on the sides of mountains or along bleak sea coasts. With the exception of a little attention in their infancy, and afterwards in "winter and rough weather," they do not cost much care in rearing, and even the breeding cows are for a great part of the year wholly exposed to the changing skies and frequent storms of wind and rain. The treatment, of course, of such cattle as those of the West Highland breed of Scotland scarcely comes within the description of a definite system. It varies with locality. Generally, from time immemorial, the calves born in winter and suckled, have run out to grass on the hills in the following and subsequent summers, coming down for the intervening winters to the better and sheltered lands, where either in the field or in the yard they have, according to circumstances, such allowance of hay or straw as may be found necessary. In many places there is much of the quasi-natural in their circumstances for the greater part of their lives. The final feeding for the butcher, also, in rich Lowland pastures, in English vales, or in the stall, is regulated by the conditions of the district in which they are matured. One has seen a noble Highland ox in his native place, occupying the most comfortable and deeply bedded of loose boxes, and receiving from the fondling hand of an old herdsman, who talked to him in Gaelic terms of endearment, his daily rations of cake and corn. But this was not an example of a common "system"; the ox was destined for Islington, and in due time won his Smithfield honours. Prime Highland steers, yearly may be seen growing fat on English alluvial lands, with or without a little cake, and, perhaps, towards the last some crushed oats or oat-meal balls to harden the flesh.

The principal features in the management of Black Welsh cattle are succinctly described by Lieut.-Colonel Platt, of Gorddinog, Bangor, one of the most prominent breeders in North Wales, in his useful little pamphlet upon the cattle of the Principality. "Our Cattle," he wrote in 1885, "are usually left on the grass until September or October, are then housed in yards and fed on turnips and chaff for two winters, and in spring of third year a large majority are purchased by English graziers and taken to the Midland Counties, where their good feeding qualities have been recognised for at least one hundred years." In the last century the oxen were worked for several years and then fed off. Colonel Platt records the fact that in 1797 twenty-five Anglesey oxen, worked to the age of nine years, were then sold, weighing from 13 to 15 score the quarter, and realising from £40 to £50 the pair. A couple from Denbighshire, worked until October and then fed on grass, cabbages, turnips and oats, were sold in March for £62 the pair, the better of the two weighing a ton. In comparison with these weights of the old working oxen of last century, he mentions as instances of the modern improvement in the direction of early maturity, a two-year-old steer, fed from calfhood, dead weight 980 lbs., and several exhibited at the fat stock shows exceeding 2240 lbs. live weight, a few over 3,000 lbs.

In times long past, when ox labour on arable farms took precedence of every other consideration in regard to the breeding and rearing of cattle, the management, like the selection of the stock, was directed to the production of agile, powerful and enduring oxen. "Even up to Marshall's time (1770-1800)," Messrs. Macdonald and Sinclair observe (*Hist. Hereford Cattle*), "cattle were in many parts used chiefly for draught, and it was only after they had discharged this function that they were fattened for the butcher. . . . It is also stated by Duncumb that up to 1805, the rearing of cattle 'in Herefordshire for the purposes of agriculture prevailed," &c., and one of the authorities just mentioned, William Marshall,

in *The Rural Economy of the West of England*, 1796, wrote of the North Devon cattle that in size they were somewhat below the desirable point for the heavier works of husbandry, but that they made up that deficiency in exertion and agility and were beyond all comparison the best workers he had anywhere seen. These references indicate the importance then attached to working power, and the place fitness for labour must have taken in the details of breeding and rearing. The Somersetshire Devon, of larger scale, formed a link between the North Devon and the Sussex breed of large and powerful oxen, suited to the ploughing of the wealden clay lands, yet even in their labour guarded in appreciation of their final value as beef makers.

Arthur Young gives an account of the management of Sussex cattle in his day, the latter part of the last century. The following is a digest of his notes upon the system: The calves mostly were born in January, but some graziers preferred to have those born in or about March. Sometimes calves were suckled until twelve weeks old; sometimes, at the end of the second week after birth, they were "bobbed" upon skim milk. Leaving for a moment Young's notes, we observe that if "bobbed" means bucket-fed, the term would be more appropriately applied to the bucket, or to the attendant who holds or tries to hold it, than to the calf which is the doer of the "bobbing," or bobbor, and not the receiver, or bobbee. An ingenious plan of defeating the plunges of a hungry calf we shall presently see. To return to Young—the Sussex calves, after being weaned, were turned out to grass during summer. In the winter next following they had hay, and in the next winter after that, straw. The steers were broken in at the age of two years and a half, and from the time of completing their third year, were regularly worked for three or four years, very seldom longer, being either fatted by the breeders or sold to the marsh graziers. Where down and marsh were on the same farm, the farmer made the best profit by grazing the oxen himself. Those farmers who did not rear their own

stock bought oxen four or five years old for £10 or £11 each, kept them until seven years old, and then sold them for £13 or £14 each. An unusually large number, from eight to fourteen oxen, were allowed to a single plough—eight oxen constituting a team, but ten or twelve being used on stiff land. The reason for employing so many was the consideration that if oxen were worked up to their full strength, growth was checked and the disposition to fatten kindly was impaired. The oxen, therefore, were worked either not oftener than on alternate days, or but lightly if on consecutive days, for the profit on the fattening was reckoned as more important than the exaction of full working power.

An ingenious device to check an impetuous calf at the pail has been mentioned:—In pail-feeding, one danger to be avoided is the sudden and excessive filling of the stomach, the more likely to occur when the calf, after a long fast, is thoroughly hungry, and perhaps thirsty too. Another is the upsetting of the pail, and of the attendant's temper, by the violent "bobbing" with the head natural to the calf when sucking its dam or nurse-cow, and instinctively, although unnecessarily, practised upon the pail or bucket. The following is the plan of a very successful rearer of calves, communicated by him to the present writer, as a simple and effectual way to prevent such accidents. The calf in its box was fed from the pail through a hole cut in the wooden side of the box, just large enough to allow it to put its head through so as to reach the pail outside the box. Of course the fore, or finer part of the neck, followed the head, but the thicker part of the neck could not pass through the aperture, so that the plunging blows of the head were impossible. The only force which the calf could bring to bear upon the inside of the pail was that which came from the action of the neck outside that aperture, and when the calf gathered up the muscular strength of its limbs and body for a headlong plunge, the force was expended in the pressure of the shoulders upon the firm woodwork of the box,

Pail-feeding is common in dairy districts, and will be found, the writer believes, a necessity in management directed to the greatest possible increase of the dairy properties of a breed, a herd, or a single cow. As it is not uncommon in many districts where grazing steers are raised, and the cows used for the general purposes of those districts, their dairy produce being an important although not the one principal return expected of them, a few remarks upon different ways of rearing calves never allowed to suck their dams, nor any other cows, will be not out of place here. The systems adopted in different kinds of dairy herds, sometimes ruled by local custom, sometimes by the different objects the breeders have in view in reference to the destinies of the calves, will be found in detail in the department treating of dairy management. For the calf, no doubt, the best of all rearing is by suckling. It thrives better, probably, on a smaller quantity of milk drawn in the natural way from the cow, and especially if it runs with the cow and can suck at will, than upon a larger quantity brought to it twice (or even three times, but more usually twice) in the twenty-four hours in a pail or bucket. If, however, the calf itself is intended for the dairy as the primary object of its rearing, the suckling system, continued for any great length of time, is not desirable, for the reason that it fosters the tendency to make flesh and to fatten, rather than the tendency to comparative lightness of flesh and aptitude to produce milk. The calf suckled by a dam yielding to it a sufficient quantity of rich milk, and never allowed "to look behind it," as the term is—meaning to lose its first flesh—surpasses the hand-reared calf in good looks and wealth of flesh; whilst on the other hand, the pail-fed calf that has been brought steadily forward without a break between the milk and dry food, or pasture stage of its life, has an advantage over the suckled calf too early and too suddenly weaned, unable to make up with cake and corn the loss of its mother's milk. We turn our attention, for the present, to the rearing of the pail-fed calf. New milk, the calf's natural food, is the

best of all foods, however it may be taken. The next best thing to sucking the cow is to have the cow's milk in as nearly as possible the natural condition. The milk should be fresh from the cow, and as near as may be to the temperature at which it left her—not cold; nor should any liquid food be below about 80° (Fahrenheit) when given to the calf. Some of the French breeders are so particular in their imitation of Nature, that they use a sort of artificial udder (the Biberon Massonat), fixed so as to avoid danger of upsetting, furnished with one large teat, from which the calf sucks its allowed quantity of milk in perfect safety from risk of filling the stomach too quickly. The rapid gulping of even a moderate quantity of milk from the ordinary pail is a source of danger to the health of the digestive organs. The calf should never be allowed to drink until, satiated, it turns away voluntarily, but should be fed, always, quite within its appetite and capacity. The pail should be scalded and thoroughly cleared of even the faintest *soupçon* of milk after every feed. Two of the most frequent causes of purging in calves are, want of cleanliness in the pails and over-gorging with milk. The least drop of sour milk about the vessel acts like leaven, and an over-feed of milk—especially if swallowed too quickly—is one of the surest sources of trouble. In cases of slight diarrhœa a few drops of tincture of camphor (as much camphor dissolved in spirit of wine as the spirit will hold in solution), say six or eight drops, in water, given in a small horn, will soothe, and often prove sufficient. In more decided cases the usual dose of castor oil will clear away the cause of irritation, and after a due interval may be followed by an astringent if the purging is severe; if it is not so camphor, as above, will suffice. The writer has found a gruel made of prepared flour a very useful astringent for calves. The flour, sufficient in quantity to make, when tied tight in a piece of linen, a ball about, say three inches in diameter, should be boiled for several hours. When taken out it resembles a pudding, but the skin, which should be then peeled off,

covers a heart as white and hard as a piece of chalk. This, reduced to a fine powder (through a fine grater, or by scraping with a knife—and a mortar may be used if the powder is still too coarse), serves as the material for gruel, which should be made about the consistency of arrowroot. One ball will go a long way, as a small quantity of the powder is sufficient for as much gruel as the calf needs at once. In pouring food or physic into an animal, whether calf, full-grown, or in any stage between birth and maturity, care should be taken to get the dose into the gullet and not into the windpipe. For this the left arm of the operator, who stands at the right side of the animal, should be passed round the back of its head and his left thumb inserted into the left side of its mouth, the fingers being passed under the lower jaw, whilst his right band holds the horn charged with the dose. By a very gentle yet powerful action of the muscles of the left arm, be can then raise the head to the proper height, a very little above the horizontal, and elevate the mouth a very little above the level of the root of the tongue. The left hand, properly worked, will then open the mouth wide enough to insert the horn without alarming or distressing the patient in the least. The horn must be inserted far enough to avoid losing its contents at the corners of the mouth, not far enough to cause a choking sensation, and the position of the head will allow the contents of the horn to be so discharged as to trickle easily down the throat into the stomach. If the head is raised too much, with the mouth too high, the probability is that the contents of the horn in rushing down will partly get into the windpipe valve and cause a commotion—coughing, tossing of the head, and the dose in a fine spray scattered over the person of the operator or shot to some distance past him. Calves are easily "horned," and so are docile animals of all ages. One of the gentlest and easiest to manage that the writer ever had in hand was a bull weighing 23 cwt.; but he had one family of Shorthorn cows, the Nonpareils of Tathwell origin, which

never would take physic but under compulsion. In every other respect they were gentle as lambs, nevertheless, for "horning," required to be tied by the neck with an ordinary cowband, and a halter ("locked," that is knotted, to prevent pinching the skin under the jaw, or drawing too tight) tied to the front rail of the stall. An assistant also had to hold on to both horns, from behind, with all his might. A more stern operator would have put on a nose-clip, called in Yorkshire "a pair o' humbugs," with a cord to the front rail; but such an instrument should be, for a female, the resort of dire necessity alone.

The most care to avoid the over-feeding of calves is necessary for the first few days, when the danger of scour and of fatal results from that disorder, is greatest. Afterwards, although the danger of scour diminishes, it is not wholly past, and, escaping that, the calf over-fed with milk at long intervals is apt to become what is expressively termed "pot-bellied," in common English, "paunchy." New milk alone, as already said, is the best food for young calves. But how long should it be continued in its purity? Rather than fix any precise age, one would say until they have learned to eat dry food, such as a little sweet hay and crushed oats, or linseed cake, either ground (some managers prefer it ground to a dust) or nutted very small. Sometimes they will learn to chew a small nut of cake before they will eat it in a more finely ground form. The age at which the calf learns to eat very much depends upon its teacher. If no care be exercised to induce it to eat until it takes to the manger out of curiosity, or when, by reason of age, it begins to crave for something more substantial than milk, the milk may be required for a considerable length of time. But if daily the manager cultivates acquaintance with the calf in its box, and occasionally sweetening his fingers with a tasty little dusting of meal allows it to suck them, which it will do readily (a bad habit, to be avoided unless there is a special reason for allowing it to a limited extent), the calf will soon

acquire a taste for dry food, and may be taught to seek it in the manger by guiding it thither, and sprinkling a little of the meal on the edge of it first, by way of enticement to seek further. A dusting of condiment, the ground pod of the locust or carob bean (without the beans) or Thorley's food, gives to crushed oats a relish which the merest infant calf can appreciate, before it acquires the taste for crushed oats or linseed meal, as a child likes sugared before unsweetened food, and takes kindly to toffy. Rearing on skim-milk, or on a mixture consisting of a large proportion of skim to new, robs the calf of more or less of the material absolutely required for the proper growth of the tissues and the natural proportion of fat. The small, hard, lean, light-fleshed sorts of ordinary cattle are results of cheating calves of a portion of the constituents of milk necessary to their fair development. Wherever skim-milk is used as tbe whole or a large proportion of the calf's liquid food, care should be taken to supply, in other food, equivalents to the materials for growth taken from them in the cream. Otherwise the growth of the calf will be stunted in one direction or another, if not as regards size of frame, at least in some parts of the whole process of increase which goes to make a thoroughly well-developed animal. In feeding artificially, the properties (constipating, relaxing, &c.) as well as the nourishing power of foods must be considered. The mother's milk (normally) has so perfect a balance of all things needed, that the calf getting it pure and from the mother directly (so escaping the risks of low temperature and sour vessels) is much less liable to the opposite evils of purging and constipation than the hand-reared calf. The choice of food will depend upon the age of the calf, the extent of its deprivation of constituents of the natural food, and the cheapest and best substitutes within reach. Low value, we must always bear in mind, is not necessarily cheapness; but when of two kinds of food, equally desirable from a feeder's point of view, one from local circumstances happens to be dear, the other cheap, the sparing of

the purse is not in such a case bad economy. For a calf not thriving quite so well as it should, a raw egg occasionally will often help to give it a start. It may be broken into its mouth without the trouble of using the horn, and is much relished. Some successful managers crush up the shell also in the calf's mouth, and allow it to be swallowed with the contents.

When the calf has got the habit of going eagerly to the manger and the rack, and can consume enough dry food to compensate for the bulk of the milk, the latter may be gradually discontinued. Yet if there is plenty of new milk to spare, a gallon a day for some time makes a capital safeguard against deficiency of necessary materials in the dry food. But in the choice of foods for stock, as much, perhaps, as in any branch of agriculture, the value of science as the chart of practice, may be realised. A few examples of systems of management in herds of Shorthorn, Hereford, Devon and Aberdeen-Angus cattle, including the various ways of treating the calf from birth, are here gathered together as illustrating the general management of cattle in England, Scotland, and Ireland, exclusive of management specially for the dairy, which is the subject of another section of this chapter. There we have distinctively dairy breeds and other breeds combining high excellence as dairy and grazing breeds, but treated in connection with the prominence of dairy properties, under systems of management conducive to the increased production of milk and butter. The following examples are mostly summaries of a few of the more generally representative systems described fully in Messrs. Macdonald and Sinclair's Histories of the Polled and Hereford cattle, and in two articles contributed by the present writer to the *Journal of the Royal Agricultural Society of England*, one on the management of Devon cattle, Vol. IV., third series, Part 2, (1893), and the other on that of Shorthorn herds, to which reference has been already made; some of them are wholly, some partly, from the writer's recollections and notes not published in either of those articles.

The Scotch system of managing herds of Aberdeen-Angus Polled cattle does not vary much. "As a rule," the authors of the History observe, "it is simple and natural," and to this fact (exception being admitted in the case of the comparatively small proportion of animals highly fed for exhibition) they ascribe the general health and hardiness, soundness and fecundity, of that breed. "No race of animals," they affirm, "can long withstand unnatural treatment, no matter how skilfully it may be pursued." The calving season generally begins in or from December, and that month, January and February, in some places March added, cover that which is considered by most breeders the best season, although some cows, a little backward, do not calve until April or May. The principal variation appears to be that some breeders prefer the suckling system, others rearing by pail, or "cog," as it is sometimes called in Scotland; but in both cases the calves are kept on milk on an average from six to eight months, other food being given with it as soon as the calf learns to eat, and gradually increased as it grows. Weaning commonly takes place in August and September, or about the end of the grass season. At that time some breeders seton the calves in the dewlap. Hand-fed calves sometimes have milk four times daily for the first fortnight; then to about twelve weeks old three times; after that twice, until weaning time. From about the age of six weeks a little pottage made from bruised linseed or bruised oilcake is mixed with the milk and the quantity increased as the calf grows; also, after six weeks old, cut turnips and straw are given. One breeder, feeder and exhibitor, of experience equally great and varied, classes the rearing of calves among the principal points of practice in the breeding and management of cattle. He had evidently recognised the dependence of future generations upon the maintenance, deterioration, or improvement of each generation as it rises; so that the perpetuation of excellence is ruled, not only by the selection and pairing of stock, but also by the extent to which

acquired excellence is preserved in the young of each generation by adequate feeding. The "calf's flesh," that well accredited authority declares, should be retained rather by wholesome food and by housing before the sting of winter is felt than by the use of forcing food; and there is one effect of delay in giving winter protection to which he directs attention—the overgrowth of the hair. Muzzling the calves for the first fortnight is practice frequently based upon the supposed danger of hair-balls from sucking one another. It is recommended by one authority to prevent calves from attempting to eat straw. For some time before weaning a little linseed meal, increasing up to about 1 lb., is given, the quantity being again increased after weaning; and as the grass season comes to an end and autumn nights grow cold, the calves are housed at night and as a rule liberally fed. The maintenance of the flesh made on milk and grass, with whatever extra food may have been given before weaning, depends upon housing in good time and supplying good food to prevent a check and loss of condition. It is cheaper to keep flesh once made than to let it go under the combined influences of cold and insufficient nourishment, and then have the cost of producing afresh. Good yellow turnips in abundance, and oat straw *ad libitum*, are supplied to heifers and young bulls alike, but the latter often have a daily allowance (say 1 lb. or 2 lbs.) of linseed cake besides; some breeders give the heifers also a little cake, but whether or not, the young bulls commonly are rather better fed than the heifers. In estimating the feeding power of the straw and turnips we must remember the superlative excellence of Scotch turnips, with which the average turnips of English growth cannot bear comparison.

In connection with the comparative advantages of hand-rearing or suckling calves, the remarks of one breeder, whose system is that of suckling, deserve attention. They are to the effect that highly-bred cows generally feel the loss of their calves so keenly when they are suddenly deprived of them,

that (being at the time probably more than half through another period of gestation) they occasionally cast their calves; and he had found that tying his calves up for about a week within sight of the mother, breaking the violence of the separation, was a preventive. At the end of the week many of of the cows are dry. The plan, probably, would scarcely succeed in the case of calves weaned much younger than those of the Scotch Aberdeen-Angus breeders, or calves less thoroughly prepared by a previous acquaintance with linseed meal and other kinds of solid food, as such calves by their own continuous bellowing would distress the cows.

The Aberdeen-Angus heifers go to grass in the following summer, and in the second winter generally have straw and turnips (limited) with water, and a grass run in suitable weather. They are mated at about two years old, some six months earlier. Young bulls are sold at about the age of fifteen or eighteen months. Steers are mostly fed off when about two years old. Cows are kept on straw and turnips in winter, and out at grass from spring to the appoach of the next winter, and two or three weeks before calving an allowance of cake (2 lbs., sometimes up to 3 lbs. in the day), and for a few weeks after calving bran mashes, cake, or some other extra food. The stock bulls (where the management is advanced) have plenty of good plain food, live in roomy boxes and yards, and are taken out regularly for walking exercise. The yards are all the better when sunshine can enter freely.

Oat-straw and turnips form the basis of cattle feeding in the great beef producing county of Aberdeen. There, and in adjoining districts, a large proportion of the very best heavy grazing stock in the United Kingdom is produced. The reputation of the beef of that part of the North of Scotland is mainly owing to the use of Shorthorn crosses upon the native breeds of cattle, the Polled breed more especially, in connection with the local system of rearing and feeding. The Shorthorn was established in those districts early in the

present century, but its influence in the development of the Aberdeenshire beef trade traces to a revival of breeding through new introductions from England between sixty and seventy years ago, although excellent Shorthorn families in Scotland trace lineally to earlier purchases from the most distinguished Durham breeders. Almost all the soil of Aberdeenshire grows yellow turnips of excellent quality, and most of it grows good crops of swedes. The farm yard manure and most of the artificial manure is applied with the turnip crop. The oat-straw, too, is very good. Hay is grown only for the supply of horses in winter and spring, not for the cattle, and there is no permanent pasture, the only seeds sown being rye grass with a small proportion of clover (red, white, and alsike clover to rye grass being about as 1 to 6 in weight of seed) with barley or oats in a six years' course of cropping—1 new grass, 2 and 3 grass, 4 oats, 5 turnips, and 6 oats or barley with seeds as stated. The older cattle are tied up in the stalls about 36 weeks in the year, the stock cows in byres, from which those in calf are never loosed from autumn to spring, everything, including water, being supplied to them in the stall; young cattle mostly in covered boxes, 14 by 16 feet, with yard of the same size to 4 heifers of 10 or 12 months old; no cattle, old or young, turned out into the fields during winter and spring. In autumn the food is barley-straw, or oat-straw, with yellow turnips. These turnips are good to February or March, when swedes take their place, and with both the only other food in common use is straw, principally oat-straw, until the grass season begins, in May. The exceptions to this diet are a small allowance of artificial food to cattle under twelve months old, and in the event of any partial failure of the turnip crop, the deficiency must be made up, necessarily, with some dry food, say, thus: 56 lbs. of turnips daily for each cow, given morning and evening; 10 lbs. of straw divided into three feeds; in the middle of the day, instead of a feed of turnips which in a good turnip year would be given,

a mixture of 1½ lb. of ground decorticated cotton cake and 1½ lb. of oat husks, the latter not for any nourishment contained in them, but to supply the necessary bulk and prevent the danger which attaches to the use of a small quantity of concentrated food alone. In the indoors period after a good turnip growing season the difference is 100 to 112 lbs. of turnips in the day, nearly or quite double the quantity allowed after a bad season, and about equally divided over three feeds, the cake and husks being omitted and straw and turnips taking their normal place in the system as the whole food for the thirty-six weeks or thereabout, a little longer sometimes in the case of stock for feeding off. The substitutes for turnips, when in exceptionally bad seasons required, of course, vary, otton cake and husks being only examples of food sometimes sed in such cases. Some breeders prefer bran, others bran nd chaff sweetened with treacle, and so forth, the object eing to get as nearly as may be an equivalent in nourishıent with the requisite bulk to fill the stomach.

Only inconsiderate stock-keepers would refuse the supply f water even to turnip-fed cows, which, although they seldom ant it should at least have the occasional offer of it, and here water is laid on, as it should be, if possible, to byres lled with cattle tied up during the greater part of the year, ıe offer costs very little trouble. The pains of thirst in a oor cow perhaps yielding milk for the composition of which ıe available water contained in the turnips is scarcely ıfficient, must be great, and humanity and self-interest alike ıll for her owner's attention to her need. The stock bulls ›metimes run loose with the cows in the fields during grass me, but in many places are kept up the year through. hey appear to be generally very docile, both in the field, ıd even, as we may in some places see them, tied up in the ıme byres with the cows in winter.

Calving time ranges generally from the beginning of Sepımber to the beginning of May, but February, March and April are the principal months in the Shorthorn herds of

Aberdeenshire. The cows always suckle their calves, and no more difficulty occurs under this system, as regards the cows breeding regularly, than in the case of cows whose calves are taken away at birth. When the cows go out to grass in May, most of them have calves at foot. In some herds, if the cow calves long before the grass season, she is turned out with the bull every day after the calf is six weeks old, and later calvers are noticed, of course, more easily in the fields, whilst the companionship of the sexes hastens the readiness to breed. The calf born before the grass time, whilst the cow is still tied up in the stall, is tied up beside her, and until it is able to take all her milk, the cow is milked regularly, and always when the calf is in the act of sucking, so that she lets down her milk freely. When the calf can take all she gives, it is set free, and the one stall is left for the cow and liberated calf, which from that time sucks whenever it will. The leading reason for denying this full liberty earlier is the belief that much of the common mortality among very young calves is caused by the surcharge of the stomach with milk. Too free and irregular feeding is held answerable for indigestion, purging, and the formation of hairballs, the latter, although primarily caused by sucking in and swallowing hairs, being in a great measure results of imperfect digestion; not because perfect digestion would dissolve the hairs that the calf had swallowed, but that such hairs accumulate in the form of balls much sooner when the digestive function is in part or wholly suspended, than when it is in full and healthy exercise. When grass flushes the milk again, hand milking once more in some cases becomes necessary, as the calf is unable to keep pace with the supply. Care to relieve the cow of the whole of her milk, when the calf cannot do so, is one of the point in Aberdeenshire management. When the calf is weaned th cow is milked three times in the day.

The calves are taught to eat oil-cake and sliced turnips a soon as they can learn the lesson, and are weaned at the ag of seven or eight months. In the latter part of summer th

heifer calves live upon their mother's milk and grass. The young bulls intended for sale in the autumn generally get a little oil-cake in the field. The heifers calve as nearly as may be when between 24 and 26 months old, and have a little extra liberal allowance of food to compensate for the early breeding and meet the tendency to consequent reduction of size. Very few calves are lost. Quarter ill, in some districts a little troublesome, is met and checked by the seton in the dewlap and a small daily ration of oil-cake. Moderate feeding and regular exercise are considered the best preventives of rheumatism.

By way of a marked contrast we may take, immediately after thus seeing the leading systems of management in the north-east of Scotland, an uninterrupted run of some six hundred miles from the north-east of Scotland to the south-west of England, and notice the system adopted in a Shorthorn herd which in bygone days produced some good winners, and was successfully bred for a combination of dairy and grazing properties, the cows being deep milkers and the steers neat in shape and remarkable for good size and excellent quality, occasionally winning at the great fat stock shows. The calves, born mostly in December, or as soon after as possible, but a few coming throughout the year, were weaned at a fortnight old and fed by pail, the finger lent to them as an inducement to suck, for another week, after which the quantity of new milk was reduced and skim-milk added, with linseed gruel to partly make up the loss of cream. The process of lessening the quantity of new milk and proportionately increasing the supply of skim-milk and linseed was continued, until roots, barley-meal, and linseed cake, in small quantities, with an unlimited supply of hay, eventually took the place of milk and gruel as winter diet, and the young stock had solid food and water exclusively. When the grass season came, yearlings and forward calves were turned out to find their own living in the fields; so that in some cases (according to age) there was a break in the foregoing system, filled by a summer's run at

grass, and the indoors system was resumed as cold weather advanced and grass declined. The same lines of plain living, adapted to age, were applied to the bulk of the herd, all pedigree shorthorns treated as ordinary Somersetshire farm stock. The only exceptions were in the cases of animals occasionally set apart for exhibition, which were housed and fed on cake and meal mixed (principally linseed cake and barley-meal) given liberally. The heifers under ordinary treatment became mothers at ages generally ranging from 2½ to 3 years. The cows lay out at nights from the first seasonable weather in May to about the end of October. If hay was plentiful and the nights were cold, they were brought under cover earlier. The cow at calving had bran mashes, 2 ounces of nitre in a bucket of water with the chill off, and her own first milk. During the fortnight's suckling, her bag was always cleared of surplus milk after the calf had been allowed to take its share. After it was weaned, the cow was milked regularly, thrice daily. The bulls, kept in their houses, were led out for exercise.

A large and very high-class bull-breeding herd of Shorthorns in Norfolk, characterised by grazing properties of the first order of merit and fair milking capabilities, as esteemed of great, although secondary importance, affords our next illustration of management. The bulls were much sought, and realised high prices, for exportation; and the constant sale of bulls by private treaty, with occasional sales of surplus females, gave the principal returns of profit on expenditure. The original and subsequent selections of stock, and the system of management, agreed in showing the constancy of a definite design to establish on the breeder's several farms a class of Shorthorns of great substance, robust constitution, and early maturity, which could spare a handsome contribution to the dairy after supplying the natural food for their calves. A good hide, mellow but not thin, with a good coat of thick-set, mossy hair upon it, was considered one of the points of prime importance, for the reason that a thin skin, with short, sleek hair, indicated a degree of delicacy inconsistent with the hardy

character and unyielding constitution of cattle qualified to stand various climates, and to come to profit at an early age. The calf at birth had a little pen to itself in a corner of the box occupied by its mother, so that they could see each other, and the calf had access to her at fixed intervals. At the age of a fortnight it was removed to one of the compartments in a calf-house, or to a box appropriated exclusively to itself, and taken to the mother to suck every morning and evening, not at any other times. If the mother happened to be a deep milker, the herdsman milked her before introducing the calf, leaving as much as he judged the calf ought to have, and, of course, that being the "strippings," or last portion of the milk, was the richest the cow gave. Thus the calf was guarded against surfeit. Some of the cows had milk enough only for their calves, and were, therefore, not hand-milked; other cows each gave what would be considered a very fair quantity as the yield of any ordinary dairy cow, up to eight quarts at each end of the day, besides retaining enough for the calf. Heifer calves were suckled about six months, bull calves sometimes a little longer. The calf, as soon as possible, was enticed to eat a little dry food, consisting of some of the following, mixed, in different proportions, and interchanged frequently, so as to tempt the appetite with variety:—Crushed oats, oil-cake (*i.e.*, linseed cake), and ground maize, with sometimes a little green food (cut cabbage or tares); but a calf does not often eat in earnest until it is six or seven weeks old, especially if it is getting a good supply of its mother's milk. By the time, however, those calves were of age to be weaned, they had gone to the manger habitually, and had acquired so strong a liking for the dry and green food as to be quickly reconciled to the change, which was thus effected without either check to growth or loss of flesh. To make the weaning still gentler, the herdsman gradually increased the quantity he took from the cow (unless the cow's yield was rapidly decreasing), until at last the calf got so little that it never missed the milk. The calves were regularly either led out in a halter, or turned out

to frolic in the straw-yard, every day. The haltering and leading tends to docility and teaches calves to step out and show themselves well, the more free exercise is conducive to activity and general health. Calving-time in that herd was from January 1st to December 31st. Calves were first turned out to grass as nearly as possible at the age of six months, but spring and summer calves, too young to have more than their daily exercise, and autumn calves, did not lie out till the following summer. All calves have setons put in the breast in spring. The heifers produced their first calves at little more than two years of age. The cows before calving were kept up for a week on long hay and bran. All cattle were housed at night during winter. The cows and heifers, out night and day, had grass only during summer; in winter, long hay if the crop had been plentiful, otherwise cut hay and straw mixed; no roots, but turned out every day in winter, to get what grass they could pick when the ground was clear of snow; when the snow lay on the ground, they had the exercise, and water, without any green food. Water also was laid on to the yards, received into tubs, and thence drawn and carried to the animals indoors. The bulls were kept loose in their boxes and led out for exercise, and were fed in winter upon cut hay and about half a bushel of roots in the day, with 1 lb. of oil-cake. In summer, green food (cut cabbages and tares) instead of hay. Aged bulls in service had about 2 lbs. of oil-cake daily in winter, none in summer. Only restless bulls, rare exceptions, and probably none of those bred at home, were ever kept tied up.

In one typical Hereford herd, February, March, April and May are the months preferred for increase by births. The calves are suckled by their dams, and if born within those months, accompany the cows when they are turned out to grass, remaining with them, and deriving their nourishment from them and the grass they learn to eat, until the autumn, when the heifer and steer calves are weaned and fed upon hay, roots, and about two pounds of crushed oats and cake each

daily. The bull calves intended for stock purposes (the herd being one of great value) are more liberally treated. The heifers and steers when turned out to grass get no extra food. Straw and turnips, with sometimes a little hay, form their diet the second winter, after which the heifers take their places in the breeding herd and the steers are generally finished at grass, making from nine to eleven score a quarter at ages ranging from two to two and a half years old. The cows have straw and a few roots until they calve. The stock bulls are kept under cover, after two years old living usually upon hay and roots, and in the summer green food, such as cut grass, vetches, and clover. All the cattle are housed in winter, some in open sheds, others in cow-houses and stalls. On a regular system of feeding, to keep the breeding cows in as nearly as possible equal condition through the year, the herd during a great number of years had never suffered from abortion, beyond isolated cases occasionally from accident.

In another herd the calving was brought generally within the narrower limits of February and March, and the summer treatment of cows and calves about the same as in the last instance. The calves' winter allowance of linseed cake was about 1 lb. to 1½ lb. daily. Cows, however, were turned out to grass in the day-time through the winter, and at night brought into open yards, excepting those newly calved, or near calving, which were housed as far as the accommodation permitted; the winter food, turnips night and morning, straw as much as they would eat. After calving, the cows had a little hay until grass time. Yearling steers had a mixture of linseed cake and cotton cake, beginning with 4 lbs. and ending with 6 lbs., with sometimes 2 or 3 lbs. of offal corn towards the end of their time. They went off at the age of two years (after their second winter's keep) at ten to eleven score a quarter. Another system is to have all calves born as early as possible in the year, because the most saleable yearling steers are those which were the early January calves, or if the breeder wishes to finish them himself, he can have them ready for

the butcher when they are about eighteen months old; also on account of the advantage of age in any animals exhibited in classes reckoning age from January 1st; and one or two other reasons which hold good chiefly in connection with the demands of purchasers for exportation. There are first the considerations of the little extra necessary cost of doing well to early calvers, especially those bringing their first calves at that time, and of the loss of the advantage of grass-time coming conveniently near the March and April births to flush the milk of the cows inexpensively.

Some of the Hereford breeders, feeding for early maturity, put their heifers to breeding at 16 or 18 months old, so that the first calves come when the dams are about 25 to 28 months old, some, probably, missing once or twice, say 2½ years, or thereabout. Other breeders, still keeping in view early development, think that from 18 to 20 months old, still bringing them to calve within 2½ years, or soon after in the event of any returning, is quite early enough. The following is the diet of the stock bulls, in one of the oldest Hereford herds well known in the show-yard:—"Good hay three times a day, and two feeds of roots; instead of roots they receive grass in summer."

A Hereford herd kept on the old system is described by the son of a former breeder, himself also a breeder. The main object appears to have been "to keep as many as it was possible to maintain on little food." No cake or corn "in any shape or form" was allowed. Steer and heifer calves, the first winter, got pulped roots, cut straw and a little hay in a "cratch," and in the day went out into the pasture. The second winter they were sent off to another farm, said to be one of the poorest and coldest spots in the county of Hereford. Their constitution, however, carried them through, and for food they browsed the bushes and got what else they could find. At night, in the fold, they had "what little straw and hay were grown at the place." The next winter the heifers had nothing but straw, and were kept on the poor land be-

cause inclined *to grow too fat*. The steers, fed mostly on pulped roots and cut straw at the home farm, were finished on grass in the following summer and sold—having made *great weights*. The cows, living on straw and calving mostly in May or June, *got fat* whilst suckling their calves, on grass, in the summer. They were excellent milkers, giving a handsome surplus over the needs of the calves.

Different systems of management in herds of Devon cattle (exclusive of herds specially kept for dairy purposes, which are mentioned elsewhere), may be generalised from the few following particulars. In the North Devon breeding district, a prominent breeder of high-class pedigree Devons gave as his reason for not adopting the suckling system to any great extent, the fact that he thought suckled calves do not acquire the same capacity to clear off coarse food as calves reared by hand. He therefore weans at ten days old, and rears in the way he considers best to promote a keen and healthy appetite. The nephew and representative successor of the famous Mr. Francis Quartly, the late Mr. John Quartly, of Champson, informed the present writer that his own management of the herd then (1892) in his possession, moderate as it was, went considerably beyond his uncle's in liberality. Himself and his neighbours, Messrs. Tapp, Mogridge and others, had acted largely upon the principle of inexpensive rearing, with faith in good Devon blood for generous maturing upon grass. In the county of Somerset, an excellent general farmer, breeding pedigree Devons for dairy and grazing purposes combined, upon land answering liberally to his own generous husbandry and usually yielding abundance of grass, has his cows calving mostly within the three last months of the year, but a few, disobedient to his rule of "between Michaelmas and Christmas," bring forth their offspring at irregular intervals through the other three-quarters of the year. Those which calve within the desired time receive generally, in addition to uncut hay, or hay and straw chaff mixed, from 2 to 6 lbs., sometimes but not often

as much as 8 lbs., of one or another of these dry foods—cotton cake, decorticated or English; bean meal; maize meal; or a mixture of two or more, whichever at the time of purchase gives best value for cost. When hay is cheap and he has plenty of it, he does not chaff it unless it is mouldy, but if it is so, he chaffs and steams, mixing in barley or oat chaff, and after Christmas some pulped mangold, increasing the latter as the season wears on. In an exceptionally scarce hay year, the deficiency has been supplied with an extra allowance of cake and corn, about 5 lbs. of each, with a run out to grass during the day. Air and exercise given every day (in ordinary weather from 10 a.m. to 4 p.m., but in rough weather not so long), help to keep the cows in a healthy breeding state. When they go out to grass for the season they get no extra food unless the season be one of extreme scarcity of grass, in which case necessity ruling puts aside the usual course of management. In years of average plenty, however, exception is made in the case of cows intended for the butcher after rearing their calves. Such cows are gradually improved with a little allowance, so that when the calves are weaned and the cows "dry," the latter are fat and ready for sale. Formerly, when female labour was employed, the calves were hand-fed; latterly (no women having been engaged in the farm work) they have been suckled, 3½ or 4 months for heifers and steers, longer for any bull calf reared; but bull breeding is not part of the regular practice here, and bought bulls generally are used in the herd. Cows only of good milking strains are kept, as an important although not a primary part of the profitable produce of the farm is that which goes to the dairy. Nearly all of the cows can rear two or three calves each, setting free more than one half of the number of cows in milk to supply the dairy. The calves of the latter are given either to cows suckling their own calves, which thus do at once the part of the mother and foster-mother, or to cows which have suckled their own calves up to the usual time of weaning. The Devon cows used to this system

appear to be exceedingly accommodating, and (under proper inducement) to take kindly to the strange calves. Some take two calves together, some two or three in succession. After having reared one calf, or two or three calves, as the case may be, any cow that has time to spare is hand-milked until within about six weeks of calving again. Very few cows cease to give milk until they are in the usual way "dried" for calving or for feeding off.

In the spring all calves go out to grass as early as they can. Yearlings in the autumn begin, under cover, their winter diet of hay, to be supplemented with a little mangold, as spring comes; or if hay should fall short in the winter the deficiency is made up with chaff, and sometimes pulped roots with it. The feeding of calves born out of the principal season is regulated according to age. The youngest get, besides hay, a little cake. In spring, heifers and steers go out for their second summer on grass, lying out until autumn, when they come in at night and go out daily until about Christmas. Their principal dry food is whole barley straw, which, if good, does very well without the addition of either cake or hay; if it is not quite up to the required quality, a little hay, decorticated cotton or linseed cake, or some other concentrated food, with mangold after Candlemas, makes up for the shortcomings. Two-year-old steers have a larger proportion of hay, more concentrated food, no straw, but two feeds of hay instead after March begins, and their run out to grass as the season comes on; but most of them are fattened off during that season, at ages varying from two years and a half to three years old, when without extra food, except in a bad grass season, they weigh well up to forty score. A very few, and those only the very best, are kept on, fed indoors from autumn to Christmas, and then sold off, at weights ranging from forty to fifty score. No steers are sold, but a few bought to feed off with the home-bred steers. Another Devon breeder, who in Somersetshire combined a small dairy business with the production of heavy steers, adopting the same system of foster-rearing a plurality of

calves, so as to set free many of his cows for the supply of the dairy, insisted strongly upon the practice of allowing every cow to suckle her own calf (left with her) for a week or ten days, to let it have its natural food, the earliest milk, called "beastings," yielded by the cow after calving. By this practice, he believed, danger of losing calves was much reduced. In his plan there is also this difference from the one just described, that the last calf suckled by a "stale" cow, that is a cow whose milking period is far spent, continues with her as long as she has milk for it.

Before proceeding to management especially suited to dairy herds, we may consider a few incidental particulars of practice and questions relative to practice.

Feeding for exhibition has been but lightly touched. The object of feeding, the district in which the animal is fed, the propensities and aptitudes of the animal, and a host of other conditions, must be dealt with in deciding the selection and quantities of food, muscle-forming food for one inclined too much to fat, bone-forming food for one, fattening food for another. The constituents of foods, the age and appetite of the animal, the climate of the country, the season of the year, and the class in which the animal is to compete, must all be taken into account. Variety, as well as excellence, of food, and a fair proportion of bulk to quality, must be borne in mind, for animals under high feeding. Concentrated food without sufficient bulk will not do, neither does bulk with poverty answer the breeder's purpose. The great Devon breeder and exhibitor, Mr. James Davy, of Flitton, when asked, "How do you bring your animals into such wonderful condition?"—replied, "By grinding sovereigns for them." Preparation for show is more or less a costly process, especially in the case of cattle of the heavy-fleshed breeds, many of which, for distinguished success, are put in training almost from the day of birth, and kept up to the mark—"in pickle" when fully developed—without interruption, until they "break down" or "break up," the former of these two terms meaning to fail on

the legs, or as breeders, or in some other physical or constitutional way; the latter term, to become so gross as to lose the evenness of surface required by judges, forming what the French call balls of fat, in England termed rolls or cushions. The American term "smooth," and the English term "patchy," are intended to express respectively perfection and extravagance of the distribution of muscle and fat as affecting the surface. At the close of the summer show season some prominent exhibitors of Devons turn their exhibited cows out to grass, without extra food, until the nights begin to be too cold.

One of the great points in feeding beef breeds for show, or indeed any breeds to bear handling, so as to be mellow to the touch, is to retain the "calf's-flesh," or, as it is sometimes called, the "sucking-flesh." The importance of using for calves milk fresh from the cow has been already emphasised (page 188). A Devon breeder, of great and varied experience, having been also a Shorthorn breeder, once remarked to the writer, that in order to get a good covering of flesh from the very first, as the foundation of great substance in the mature animal, the calf, whether suckled or pail-fed, should always have its milk "alive;" not "dead milk." He considered that the change in milk (converted blood), as in blood a short time after it is drawn directly from the veins, was literally death; and that whilst dead milk had great feeding properties, it had not the same power as living milk to assimilate with the system of the calf, and to maintain the calf's original flesh. The remark, as that of a practical breeder who observed and thought, may be possibly worth attention.

In showing a herd privately to visitors, a certain amount of judgment is required, to make the best impression. This is sometimes a matter of pounds, shillings and pence, but it is more than that. If an artist paints a good picture he does not hang it upside down, nor in a bad light, nor place it beside a picture of conflicting colour. It is no mere trick of trade, but an act of good taste, which no honest man would be ashamed to own, to place cattle so that they can be seen to advantage;

not beyond their merits, for that is out of the question (putting aside *such mean devices as the herdsman's hand "accidentally"* laid upon the nose which happens to be a black one, in a buff-nosed breed), but it is simply causing the merits which are there to be fairly seen. The animal led out in a halter, or the bull led by staff or cord to the nose, should be walked about in a way to be shown properly all round, and when pulled up should not have the fore-quarters stuck down in a hole, nor be allowed to stand with one foot in an unusual position, throwing the whole frame out of form. The attendant should remember that the visitor wants to see, not him, but the animal he leads, and therefore should not interpose his own person in the line of view; and if he have a bull by the nose, by all means he ought to remember that a bull's head is not an ant-eater's. One does see a noble head sometimes utterly ruined by the elongation of the nose with a very unnecessary dead pull, to which it yields like indiarubber. The same pull, too, brings down the majesty of the crest, making the grand arch of the neck disappear. There is much, also, in a fit assortment of cattle. The late Mr. Hugh Aylmer, of West Dereham Abbey, Norfolk, used to have his Shorthorns grouped separately in different fields according to age: the aged cows, the three-year-old cows, the two-year-old heifers and the yearlings, and the weaned calves had their own houses and exercise-ground. About the yards, also, a similar arrangement was observed in the occupancy of the houses and boxes.

The feet of all animals should have proper attention. Bulls getting plenty of daily exercise on hard roads will wear down the hoof so as to seldom require paring or chipping; but on gravelly ground a particle, large enough to cause lameness, may get pressed into the under part and worked in. This should be carefully cut out, tar inserted, and the foot protected with a bag made of any common material to fit on, tied securely, but not too tightly round the ankle or fetlock. Bulls kept in bedded boxes, or standing in stalls, and out only on soft roads or grass, will often want the points shortened, and the soles

pared. Some old bulls are very steady and quiet, and will allow the fore-feet to be lifted alternately, like those of a horse. The soles should be pared with a proper farrier's knife, turned at the end, held in the clenched right hand with the butt-end of the handle to the thumb, and the blade consequently out to the right, supposing the back of the hand to be uppermost, and worked from the operator ; but lessons from a competent veterinary surgeon or shoeing blacksmith should be taken by the manager, to enable him either to do all these things himself, or to see that his men do them properly, unless for such frequent attentions the animals are put into professional hands. As accidents may frequently happen, or be prevented, when the professional man is not within call, much inconvenience and loss will be spared if there is some one on the spot who has the use of his head and hands on all emergencies. As an engineer gets an important part of his training through the "shops" (departments of manufacture), an agriculturist who aims for personal competency need not feel ashamed of a practical acquaintance with all branches of his calling. For a herdsman who wishes to fill a position of trust in the management of cattle, such learning is often indispensable, together with knowledge of the treatment of the cow and offspring in various cases of difficulty in parturition, and such operations as bull-ringing, chopping off canine points (called wolf's teeth) in the cow, and hoof-dressing ; only, when it is a case for the veterinary surgeon, let no quackery be practised. One or two hints upon the subject of hoof-dressing may be useful. In order to pare the feet of an old bull, with safety to himself and the men, casting is very often necessary, unless the bull be exceptionally gentle. This must be done with proper straps and cords, so as not to pinch or lacerate the skin ; the cords from the fore-legs passed between the bull's hind feet, and those from his hind legs between his fore feet, so that when the attendants, at a given signal, pull them in opposite directions, the bull's fore and hind feet are drawn together under him, and having no power to balance the weight of his body upon

the small point of ground left, he is easily pulled over upon his side by the man or men at his head, and the barn or yard in which this is done having been previously bedded thickly with straw, he falls softly, although heavily upon it, the operator, in the usual way, fastens the fore and hind legs together; and the bull, if properly secured, lies helpless through the operation, which should be done with all expedition, consistent with due care. If, however, only the points of the hoofs want shortening, that may be done without casting, by placing a strong board under each foot in turn, so that the bull can be made to bear a sufficient part of his weight upon the board to keep the foot quite steady; then, with a sharp, strong, small-tooth saw, or with a strong, sharp, broad chisel, the ends may be sawed or chopped off, care being taken not to take off so much as to "cut to the quick." For a cow in-calf, if the cracking of the hoof, or any other reason forbid waiting until after she has calved, the saw is much better than the chisel, as the cow in that condition, sensitive to anything sudden and startling, might be excited to premature labour. For paring, or shaving down, the rounded sole of a cow, heifer, or young bull (even of an older bull, if he will allow it), the hind feet may be raised by means of a thick, strong, bow-shaped bough of a hard-wooded tree, say an oak or ash, some 3½ or 4 feet long, with straw or other padding twisted round it, and a piece of old carpet sewed round the padding, the ends being left bare. Round one end a round cart-rope is fixed. The rope is then to be passed over a beam or a pulley, and the loose end of the padded bow being passed under the front of the hock, a strong man at each end of the bow can raise the leg, and the man at the loose end pulling the rope twists it two or three times round his end of the bow, so as to steady it at the right height, but does not fasten it, so that at any moment he can let the rope run, and the leg go freely to the ground. The danger to be guarded against in this lifting is that the animal naturally kicks to get the leg free. This probably always happens. In the kicking the stifle might be slipped, or some injury from strain

occur. The object, therefore, is to get the leg above kicking height, and both men holding the bow, to press it forward against the front of the up-raised hough, in the angle formed by the hough and leg in that posture. This, if skilfully done with sufficient strength, effectually stops the kicking, and enables the operator, with the knife, to trim down the sole to the right size and shape. When the animal shows signs of distress from standing on three legs, it is better to let the one under the operation go down for a little rest, and raise it again, after a few minutes, then to hold on to the end. The fore-feet of cows and young bulls and heifers, unless the animals have never been handled properly, and are, from neglect, half wild, should be easily lifted with the hand, and held with one arm, whilst the holder's other arm and hand are free to use the paring-knife. The operator must take care as the yellowish colour of the sole changes to reddish colour, for he is then near the quick. If, by accident, he goes too far, and blood begins to ooze out, he must stop, smear the cut part with tar (always to be at hand on such occasions), and put a sock on the foot to keep the tar in and gravel and dirt out until the sole is hard.

The haltering of animals, a simple thing, has still scope for negligence or mistake. A halter should be of the right size for the animal that has to wear it, and that part of the halter which goes round the throat and behind the horns or the polled crown should be carefully placed behind the ears, so as to keep it out of the eyes. If the animal is to be tied up by the halter, or is one that pulls against it when led, the halter should be, as it is technically said, "locked"—that is, the leading-rope should be looped and formed into a knot round the hole through which it passes (under the jaw), so that it can neither slip loose nor draw so tight as to cause pain, not only by being too tight all round, but also probably pinching the loose skin and so causing acute pain, which often accounts for led animals becoming unmanageably refractory, and tied-up animals injuring themselves in frantic efforts to

break away from intolerable suffering. A merciless attendant will beat an animal for supposed vicious temper when it is suffering tortures from his own ignorance or carelessness in putting on the halter improperly. In sending animals by rail, tied up, this is of great importance when halters are used, as they very often are. A strong leather structure, on the principle of the horse's "headstall," is better, however, than a common hemp halter for valuable animals sent long distances.

The provision of cattle boxes, at a lower rate than horse-boxes, having been recently introduced in the railway system, we cannot doubt that the importance of the safe transit of cattle at reasonable rates will be soon generally recognised and met by an adequate supply of boxes specially constructed for the conveyance of cattle. The cattle truck, even covered with tarpaulin, is draughty, and the goods train to which it may be attached is slow, whilst the cattle train takes all comers, and the owner of valuable stock, not knowing whence they all come, nor in what state of health they all are, will not trust valuable animals to such chance company, even if the animals be in different trucks. The horse-box, however short may be its time, is still the most available means of conveyance. Horned cattle, tied to stand as horses stand, are liable to have horns knocked off by hitting them against the under side of the upper hinged partitions intended to separate the horses' heads, and yearling heifers or bulls, when frightened by the noises of the railway, and sudden jars of shunting, have a knack of doubling themselves up and getting their bodies wedged between the front of the lower partition and the front of the horse-box. A safe plan is to turn them with their heads in the contrary direction, and tie them to one of the hinges of the lower or side partition, calves to the lower hinge, heifers or young bulls of considerable size to the upper hinge, with sufficient length of rope to lie down, not more, so as to avoid as far as possible the danger of getting their legs over the rope. Full grown bulls, or cows of horned breeds, if tied the same way the horses stand (and for very large animals this may be some-

times desirable), should travel, if possible, without the upper or head partitions, which should be lifted off their hinges and so tied with strong cord to the hinges of an empty compartment as to fix them from knocking about. If the whole of the horse-box, however, is occupied, and the company's servants cannot stow elsewhere the head-partitions (or "flaps"), the choice remains between reversing the position of the animal and the risking injury to the horns.

Among the numerous dangers which the watchful manager will detect often in time to prevent loss, are those of accident from nails, glass, and various odds and ends, dropped, thrown, or left about by negligent workmen or other thoughtless persons; clippings of brambles, thorns, yew trees, &c.; dead game, vermin, or other small animals or birds, wild or domesticated; carrion brought into the fields by strange dogs; pollution of streams and other drinking places frequented by the cattle; and many other causes of injury to the feet, the eyes, or the digestive organs of farm stock, causes of abortion, and poisons dangerous to life. The yew just mentioned is occasionally a deadly poison; and whilst it is said that hares, deer, and other animals having constant access to yew trees and even yew groves or coverts take no harm, very heavy losses occur from yew poisoning, sometimes from the same trees beneath which the herd has habitually sought shade or shelter from sun or storm. It is very possible that cattle will occasionally eat that which, as a rule, they reject, by an instinct inherited from wild progenitors, but less strong in their domesticated descendants, teaching them to shun poisons. However this may be, and although it is said that cattle have been known to eat of the yew with impunity, yet the fact that they not seldom are unquestionably poisoned by eating yew leaves is surely sufficient to convince every prudent manager of the folly of allowing the cattle under his care to go within reach of yew-trees, their clippings, or their fallen leaves.

The subject of "sex-breeding," or the production of male or female offspring at the breeder's will has not been handled in

the foregoing pages. The reason is that the author, having given many years' attention to the various theories put forward (one directly contradictory of another, yet each said to be proved by a multitude of facts), fails to find any one of them with "a leg to stand upon." To discuss them again would be waste of time and paper.

About "Freemartins," a word might be expected. The Freemartin is variously understood to be a heifer born twin with a bull, and a *barren* heifer born twin with a bull. Thus we see under discussion in some works (Youatt's "Cattle" for example), the question whether Freemartins are usually barren or not so, and elsewhere the question whether heifers born twins with bulls are usually Freemartins. To avoid all ambiguity we may dismiss the term "Freemartin," and say that heifers born twins with bulls are frequently barren. Probably it would be safe to say that in a large majority of cases they are so, but some of them breed. The author believes that a not uncommon belief that the bull calf, born twin with a heifer, is also barren, is nothing but the outcome of unwarranted assumption and crass ignorance.

The period of gestation in the cow is usually reckoned as forty weeks, or 280 days. Perhaps the nearest approach to an exact average of normal gestation, so far as it can be ascertained, is 283 or 284 days; but the forty weeks is the safer calculation, as fixing the special attention of the manager and his herdsmen to the cow rather before, than at, the expiration of the full period. Healthy, strong calves, however, are often born a week or two, or even longer than that, before the expiration of the forty weeks; but those born earlier than about the 270th day are usually somewhat small, and if the points of the hoof are examined they will be found unfinished, ragged, not clearly smoothed off. Calves born from a month to six weeks before the full time are very small, short in the hair, and sleepy. They usually snooze away the six weeks or the month, as the case may be, and require a good deal of arousing to induce them to receive the food given

to them, require much care in feeding and keeping warm, but, if they live, seem to be no worse eventually for their premature birth. We see occasionally immense animals at maturity, which were 36 weeks' and even 34 weeks' calves.

To guess before hirth the sex of a calf from the length of the period of gestation the cow has fulfilled when labour comes on, is very uncertain. The common impression that calves much "over the time" are oftener bulls than heifers is no doubt in general experience apparently justified by facts; but a close examination of statistics sufficiently wide in range discloses the difficulty of establishing any trustworthy rule in this matter.

SECTION 2.—DAIRY MANAGEMENT AND RECORDS.

Just as there is no specific for the cure of jaundice, for instance, or of a cough, or of any other ailment which may arise from any one of a plurality of causes, and should be treated according to the medical practitioner's detection of the particular cause, so no prescription can be warranted for either the rearing of heifers as dairy stock or for the feeding of dairy cows. Circumstances must rule the diet, and the treatment from birth to death, of dairy cattle. The best guides to good management, no doubt, are found in records of systems of management adopted under various conditons, and in the judgment and intelligence of managers. Within the last fifteen years or thereabout, the practice of keeping records of dairy produce in connection with memoranda of the food and treatment of the cattle, has very much come into favour. It is not yet, indeed, adopted half so frequently as it should be, still in the published records of produce privately registered originally for the use of owners of dairy herds, with details of food supplied to the cows of those herds, and in reports of dairy tests at shows, we have a mass of information which cannot fail to help practical men immensely. From some of those reports and records a few

examples are here taken for the reader's consideration as *illustrations of management more or less successful*, and as facts showing the capabilities of cattle and the possibilities of produce. Although it is not possible to give similar particulars of the tests of many breeds, those selected will serve to indicate the lines upon which any owner may put to proof for his own use the powers of any breed or breeds he may wish to try. They are not chosen as supplying statistics of either the utmost or the average yield of any one breed in milk or butter, nor for the recommendation of any one breed.

In these examples the term "cow," or "cows," is used to cover all bovine mothers, irrespective of age and of the number of offspring. In many cases some of the animals tested are in milk for the first time, and some are little over, or indeed are under, the age of two years. Distinctions of "heifer" and "cow," however, are sometimes questionable. When it is possible and convenient, nevertheless, to mention the ages, they are stated without variation of the term which recognises them all as "cows." Some particulars of the same kind will be found in the section of this work upon the different breeds; but beyond those particulars which seemed necessary to vindicate the claims of some of the breeds to respectable rank among dairy cattle, such matter has been reserved for use in connection with management, upon which, as well as upon breed, the development of dairy properties largely depends.

The dairy records of Lord Braybrooke's herd of Jersey cows at Audley End, in Essex, for which a cup of the value of £50 was awarded at the meeting of the British Dairy Farmer's Association in the year 1883, command notice as containing a large amount of valuable matter concerning both the food supplied to the cows and the milk and butter produced, and as leading records in their day, having been started in the year 1880, and on their publication having served to draw the attention of owners of dairy herds to the great importance of systematic registration. Although with

the advance of dairy science, later records have become in certain details more exact, the Audley End register was ahead of the time and manifested a strong and comprehensive grasp of the subject. In 1882, the year of the records which gained the cup in the autumn of the following year, the dairy produce of the 20 Jersey cows was registered. Four of the number were two-year-old, 2 three-year-old, 3 four-year-old, and 4 five-year-old cows; 1 cow had reached the age of six years, 2 were seven years old, 1 was eight years, 2 were nine and 1 was twelve years old. Their food from January 1st to February 19th consisted of 2 quarts of bean meal, 3 pecks of grains, 2 quarts of malt dust, 2 pecks of chaff, 8 lbs. of hay, and 10 lbs. of carrots to each cow daily, and the cows were out at grass from two to four hours in the day. February 20th to April 2nd the same, with these differences, that the cows were out from three to six hours, and when indoors had 10 lbs. of mangold instead of that weight of carrots. April 3rd to May 7th the same, with four to ten hours on grass, and the allowance of hay reduced to 4 lbs. each. May 8th to 21st, bean meal 2 quarts, grains 3 pecks, malt dust 2 quarts, chaff 2 pecks, hay 4 lbs., mangolds 10 lbs., and out at pasture from ten to twenty hours. May 22nd to July 9th, bean meal 1 quart, crushed oats 1 quart, grains 1½ pecks, chaff 1 peck, mangolds 10 lbs., on grass twenty hours. July 10th to August 20th the same, less the mangolds discontinued, probably all eaten up. August 21st to October 26th, bean meal 2 quarts, crushed oats 1 quart, grains 3 pecks, chaff 2 pecks, on grass twenty hours. October 27th to November 20th, bean meal 2 quarts, crushed oats 1 quart, grains 3 pecks, chaff 2 pecks, hay 4 lbs., on grass eight hours. November 21st to December 31st, bean meal 2 quarts, crushed oats 1 quart, grains 1 peck, carrots 10 lbs., hay 7 lbs., malt dust 2 quarts, and on grass from two to four hours. The length of time on grass, in the colder months, would of course depend upon the weather. When cows return crowding towards the gate, the sooner the gate

is thrown open the better for the cows and for their owner's pocket. Standing anxious to come in, frequently bellowing, feeling cold and uncomfortable, and getting neither nourishment nor rest, they rapidly lose condition, and if in milk, lessen very considerably the quantity they yield. This is one of the points a good manager will always bear in mind, both for humanity's sake and with a view to economy, for few oversights in the care of cattle are more wasteful in their results than this want of attention to the homeward-bound cows on a sharp winter's afternoon. Exposure to cold must always increase either the consumption of fat-forming and warmth-producing food, or the combustion (life-maintenance being a process of burning) of the fat already formed. Illustration of this necessity is seen in the craving for oil or fat by the inhabitants of cold regions, Esquimaux for example. As an instance of their appetite, a story is told of one of our Arctic explorers who tested the taste and capacity of a boy of that race by giving him the run of the ship's store with an unlimited invitation to satisfy his hunger, and as pound after pound of candles disappeared, was obliged to save the remnant by the gift of a large piece of fat pork in commutation of the grant.

The period of milking at Audley End in 1882 averaged over 41 weeks. The largest yield of milk was 3,609 quarts in 50 weeks; the average yield 1,915½ quarts, or 478·875 gallons, the total yield being 38,310 quarts; the total weight of milk, at 10 lbs. to the gallon, 95,775 lbs., averaging 4788·75 lbs.; and the percentage of butter to milk about 9 ounces to the gallon, or one pound of butter from every 7 quarts *plus* a small fraction. Comparison of the Audley End records for 1883 and 1884 with those for 1882 shows very little variation from this percentage, and the average of the three years' averages brings it to just the same. Although the extent of variation differed considerably, one year compared with another, between a minimum of 5 ounces and a maximum of 19 ounces to the gallon, the averages of the different years

ranged only from 8½ to 9¼ ounces. One of the very important lessons of these records is the demonstration they afford of the error that is possible in estimating the value of a cow by her extreme butter record. One cow had a record of 13¾ lbs., another of only 8¾ lbs. of butter. Now one would suppose that a 5 lbs. margin in the height of the milking season of both cows was one which could not be easily wiped off; but the records of the entire season, and still more, those of three consecutive years, proved the competition between them to be a veritable realisation of the fabled race of hare and tortoise. The steadier and longer yield of the cow with the smaller record gave her, at the end of each year, the advantage over her rival, not only in the quantity of milk, but also in that of butter, and consequently (as the cash columns likewise show) in the total value of produce.

The foregoing particulars of the Audley End records are extracted partly from information published in connection with the award of the Cup in 1883, and partly from the tabular statements and accompanying notes of the manager of the herd in Vol. III. of the "English Herd Book of Jersey Cattle." From the Herd Book are gathered the following particulars of management and produce, given by Mr. John Frederick Hall, then of Erleigh Court, Reading, in a highly valuable communication upon the milk records and butter tests in his herd of Jerseys, and comprising, with other important matter, a section upon making butter from scalded cream. The winter diet (October to March) of each cow in milk is—hay 8 lbs. to 12 lbs., part chaffed with about 2 lbs. of oat straw = 10 lbs. to 14 lbs.; roots—carrots and parsnips, or mangolds pulped, from one-eighth to one-quarter of a bushel; mixed meal (maize meal, ground oats, decorticated cotton cake, bran, and locust bean meal) 7½ lbs.; and grass, weather permitting. The summer fare (April to September) grass and mixed meals. The cows in milk, in number as hereafter stated, are confined to three small fields, together about seven acres, from the time of turning out until the hay is carried,

when they share with yearling and other heifers the range of 25 additional acres; aspect, sloping to the north, gravel soil affording natural drainage, the pasture almost every year suffering from drought in July and August. Mr. Hall truly remarks that "rich grass and ample acreage afford, unquestionably, the most favourable conditions for a butter dairy; but where these do not exist their want may be, to a great extent, supplied by feeding daily with a certain proportion of concentrated foods, such as decorticated cotton cake, maize meal, and ground oats. His own cattle get in summer from 3¼ to 4½ lbs. of mixture of decorticated cotton cake, maize meal and bran. The allowance seems somewhat small considering the restricted area and the summer droughts, but when the latter occur the yield of butter is supported by increased rations of concentrated food; and during the margins between summer and winter, in spring and autumn, when the cows are housed at night, hay to the extent of about 7 lbs. is given to each cow. Larger records of dairy produce than those shown at Erleigh Court might be obtained, no doubt, by the allowance of more forcing diet, but Mr. Hall's system, whilst intended to develop the capability of producing butter, is designed to stop short of straining the vital energies of the cow, and so endangering her life. The rule is to dry the cow six weeks before calving, and during that time she has no mixed meal. Of the seventeen cows in milk in 1884, three completed respectively their eighth, seventh, and fifth years, two attained the age of four years, seven reached the end of their third year, and five finished each her second year. As some of these cows, however, were only a few days in milk within the year (three days, nine days, twenty-one, thirty-one and seventy-nine days being the shortest periods), one having been imported in May, two bought in July, and seven sold within the year, one in March, one in June, two in July and three in October, the milk record of the year does not serve as a test of the productiveness of the whole number of 17

milkers or dry after milking, throughout the year of 366 days (leap-year), we count only four averaging 324½ days in milk and 41½ days dry; 6,249 lbs. 5¾ ozs. of milk; and a daily average yield of 19 lbs. 3 ozs. of milk.

In comparison with the foregoing particulars of the length of the milking period in Jersey cows under ordinary management, without any effort either to force the quantity of milk at any time to extreme measure or to prolong the period, some of the American statistics of duration seem prodigious. American-bred Jerseys have been successfully fed to go on milking year after year, and to yield large yearly average quantities of milk, when failing to breed; the quantity, abating a little during the winter months, increasing each year at grass-time, when the cow "freshens" again as a milk-producer, thus prolonging the period for three or even four years from the date of the last calving. No records of Jersey-bred cows, even in America, doing the like, are within the writer's memory. In America, the fancy for the exact Island type of Jersey cow appears to be much less strong than in England, the more business-like American breeders preferring stock both thoroughly acclimatised and bred up to record-beating, which can be done only by developing increased power to bear the strain of forcing by extremely stimulating and plentiful food.

Some highly interesting particulars, full of useful information to managers of dairy herds, are contained in the report of the stewards and judges upon the first show of the English Jersey Cattle Society, held at Kempton Park, Sunbury-on-Thames, on the 15th and 16th of May, 1890, comprising also an abstract of the Society's butter tests from their commencement in October, 1886, to May, 1890. This abstract includes the results of ten tests. The cows tested were all Jerseys, in number 133, of ages varying from under two years to over twelve years. The quantity of milk is stated in weight, and the weight taken as 10 lbs. to the gallon may be readily translated into measure. The butter ratio, as proved by the

tests, shows but little variation between the ages of two and six years, the average of cows of those ages being about eight quarts (2 gallons, or 20 lbs.) of milk to one pound of butter; but after the sixth year, up to nine years old, about seven quarts to the pound of butter. The average yield of milk from two to three years old is 2½ gallons (25 lbs.) daily, increasing to the fifth or sixth years, when it averages a little more than 3 gallons (30 lbs.). This average is maintained for some time not definitely proved, as the cows of more extreme age were too few in number to serve as the basis of any computation of the average length of time. That, of course, varies according to the constitution and circumstances of each cow; but it is supposed that if an equitable average were obtained, no considerable decline, if any, would be shown before completion of the eight or ninth year. The fact that whilst from two to six years old the average butter ratio is about 8 quarts of milk, and from six to nine years old about 7 quarts to one pound of butter, shows the increased richness of the milk at the age (about six years) when the Jersey cow, in the opinion of the analysts of this important series of butter tests, appears to reach her zenith. In connection with these averages, the average ages of the winning cows in the whole series of tests supply corroborative evidence in support of that opinion. The ten first prize cows averaged in age 7 years, 3 months and 10 days; ten second prize cows, 6 years and 2 months; ten third prize cows, 5 years, 8 months and 2 days; and ten reserved number cows, 5 years, 5 months and 8 days. The largest quantity of butter from one day's milk taken in the course of the ten tests was 3 lbs. 5 ozs., being at the rate of 23 lbs. 3 ozs. in the week, from a cow between six and seven years old.

The butter ratio of the tests at the Kempton Park Show in 1890 differs from that of the more extensive tests of the previous three years and a half. The cows were divided into two classes: one class comprising 21 cows which had bred not fewer than three calves each; the other class, 7 cows

having each had not more than two calves. The average age of the older class was 6 years, 8 months and 18 days; of the younger class, 3 years and 17 days; and the two classes together, 28 cows, averaged 860 lbs. live weight, 80 days from date of last calving, 28 lbs. of milk and 1 lb. 12½ ozs. of butter, showing a ratio of a little more than six quarts of milk to the pound of butter.* One cow, 4 years and 9 months old, 677 lbs. in weight, yielded in the day (at two milkings) 38 lbs 6 ozs. of milk, a rate at which her own live weight would be exceeded by the weight of her milk in 18 days. Particulars of feeding for a fortnight before and during the show are supplied. Some of the cows had been out day and night, some partly on grass and partly stall fed. Among the latter, the following are a few of the details of daily rations; 2 lbs. cotton cake, 2 lbs. feeding cake, 3 lbs. crushed oats, 1 lb. linseed meal, 4 lbs. germ sharps; 2 lbs. cotton cake, 2 lbs. dairy cake, a little crushed oats, 3 lbs. to 4 lbs. bean meal, 7 lbs. dried grains and a very little mangold with chaff, in some cases bran, varying from 2 lbs. to 6 lbs., given with one or more of the foods already specified; in some cases 2 lbs. to 4 lbs. of linseed cake. Mangolds varied in quantity, in different statements, mostly given at the show, or to stall-fed cows at home:—1 lb. (only a taste), 9 lbs., 10 lbs., 12 lbs. and 14 lbs., and stated in measure ½ bushel to 1½ bushels. The report emphasises the fact that "in the case of two cows an excessive use of mangolds had destroyed every trace of colour" in the butter. A small quantity of parsnips is also

* Mr. Dumbrell, the proprietor of an extensive dairy at Ditchling, near Brighton, wrote to Mr. Palmer, of Stewkley Grange, Leighton Buzzard, October 30th, 1875:—"I think you will find that about 7 or 8 quarts of milk (depending on the time of the year, and of course with a fair proportion of fresh cows) will produce one quart of cream, which will, as a rule, make 1 lb of butter—in summer, possibly a little more." A seven year old cow belonging to Mr. Simpson, of Wray Park, Reigate, gave, in the fourth week after calving, 284 lbs. of milk, which, kept separate daily in shallow vessels and allowed to stand 36 hours (in the month of February) yielded 16 quarts of cream, which when churned gave 16 lbs. 5 ozs. of butter.

among the items. Some cows, at home out at grass day and night, had artificial food only at the show; other cows, although out at grass, had been allowed a little hay, or a little decorticated or other cake, Bibby's cake, meal, crushed oats or crushed wheat; a few had a little Thorley's food during the show, and for wholly stall fed cows we have these three varieties:—(1) 8 lbs. hay, very little grass, 2 lbs. Thorley's cake, 1½ gallons crushed oats, 1½ gallons bran, 9 lbs. mangolds; (2) ensilage, rye and tares 40 lbs., bean meal 3 lbs., maize meal 3 lbs.; (3) cotton cake 3 lbs., crushed oats 2 lbs., bran 3 lbs., mangolds 1 lb., Thorley's food ½ lb., quantity of hay or green food not stated, but no green food given for a week after calving. The full report is given in the Society's "No. 8. Register," or Supplement to the "English Jersey Herd Book" for the years 1890 and 1891. Many other valuable records of dairy produce in Jersey herds are published as part of the matter supplemental to the registration of pedigrees in the English Herd Book of the breed.

Full particulars of the management of Jersey cattle, both in their native island and in English herds, are given in Mr. Thornton's paper on the breed in the *Journal of the Royal Agricultural Society of England*, vol. xvii., S.S., Part 1 (for 1881), reprinted in vol. ii. of the Herd Book. Only a very much condensed summary can be here given. In the island, Jersey, the principal points of general management are: calves born January to March, hand-feeding of calves from birth, new *milk the first fortnight, then skimmed milk three times a* day, afterwards a little bran with the milk, and at about six weeks old, hay, pulped roots, chaff, and a little meal, as they learn to eat; spring and summer, cut grass, skimmed milk gradually reduced, sometimes steeped linseed substituted; at 5 or 6 months old tethered out. Heifers produce their first calves from about or before two years to two years and three or four months old. The cows dried four to six weeks before calving get straw and a little hay; towards the time of calving, bran mashes and barley meal or linseed meal or linseed are

given. Roots seldom if ever given before calving; great attention paid to the cows at time of calving; keep moderate up to that time, then bran and warm water. Bran mashes or barley meal daily, with a full supply of lukewarm water. Some breeders keep up this treatment for a month, a practice which perhaps errs on the side of caution. For two or three months the cow is milked three times daily. The tethering system comes in from May to October, the cows lying out at night, but taken for shelter from the heat and flies in the middle of the very hot days. In autumn, scarcity of grass is made up with leaves of the parsnip, mangold, or cabbage, and the cows are out for only a few hours on favourable days as winter approaches, and kept in during stormy weather. The winter feeding, indoors, consists of hay and parsnips, carrots or mangolds, with a run out in the middle of the day, and straw at night. When the cow is in full milk, from 8 to 12 quarts in the day, giving 7 to 10 lbs. of butter in the week, a ratio of about 8 quarts of milk to the pound of butter is a fair yield; but taken on the whole year, a cow's average of 5 lbs. to 6 lbs. of butter is considered a good one. Bulls, generally on high feed, and thus kept in good condition, are seldom used over two years old.

In England the management varies in different districts. The following details of practice, sometimes contrary to one another, are gathered from different breeders' systems. First, the choice of food for cows is considered.

No roots of any kind given for the alleged reason that all roots affect the flavour of the butter. No long hay given, because it is likely to be partly wasted: hay chopped, mixed with linseed steeped in water, stands 24 hours fermenting, and then is readily consumed; 3 or 4 lbs. of cotton cake (which must be pure) both increases and enriches the milk; for a thin and weakly cow, 2 lbs. of oil cake daily. The same objection to roots is repeated, and as food which does not taint the butter, hay and straw chaff mixed with bran and boiled barley is a mixture recommended for great increase of

milk. The barley is boiled until it bursts, the hot liquor *poured over the chaff mixture, which then stands 12 hours* before it is given to the cows. Elsewhere, carrots pulped with swedes and mixed with bran; cabbage commended. In another herd, from the seventh or eighth day after calving, meal and chaff, or cake with hay, the meal mostly barley, pea, and maize mixed, 10 lbs. in winter, 6 lbs. in summer; cows dried 6 weeks before calving, when the meal is discontinued, and rough hay or straw (oat or barley) given in a sheltered yard; mangolds not given till late in the spring, for the reason that whilst they increase the milk they do not increase the butter. Another system of feeding cows is—through the summer nothing but grass; the rest of the year plenty of hay, cabbage, and roots, and in winter a little cotton cake. Secondly, the time of calving engages attention.

(1) As a preventive of milk fever: cows kept up three weeks before calving on dry food, with a weekly dose of salts and sulphur; after calving, bran mashes for a few days, then hay chaff and the usual food. (2) The cow, brought into a box a fortnight before calving, has a drink of salts, ginger, nitre and ale. After calving, milked clean, drenched, and has a pailful of warm oatmeal gruel, food for four following days bran mashes, lukewarm water is given, and she is milked three times a day. At the end of a week, out an hour or two daily in fine weather. (3) The cow calves in a loose box, has a bran mash twice a day, and lukewarm water; on the third day, in favourable weather, goes into a sheltered yard for a few hours in the middle of the day; on the seventh or eighth day to the cow-house, and there has her share in the general diet of the cows in milk. The third class of details concerns the calf at birth.

One successful breeder has a handful of salt sprinkled over the calf as soon as it is born; then the dam licks and strengthens it. This plan may be a very good one, and it is certainly that of a very observant breeder, of large experience. The present writer, however, does not understand the object

of sprinkling the salt, unless it is to give the cow a relish for the gruel that is to follow. The cow, almost or quite invariably, in his experience, is eager enough to lick her calf without the enticement of salt, and a curious instinct instructs her to lick it along the spine, beginning about or behind the loin, and gradually forward to the shoulder, all the way rasping it with her rough tongue. The strengthening effect upon the calf is wonderful, and this part of the licking is scarcely finished before that calf is upon its legs, or very nearly successful in its efforts to stand. A little salt rubbed into the calf's mouth at birth often hastens its efforts to clear its breathing-pipes, and may in some cases avert death from choking, and this use of the salt some managers would prefer to sprinkling it on the calf, lest so used it might be licked by the cow into the calf's eyes. The herdsman, too, in many very well-managed herds, putting his mouth within the calf's, which for one moment he holds open for that purpose, endeavours to open the air-passages and partly inflate the calf's lungs by blowing with all his might and instantly closing the calf's mouth. In cases of prolonged labour, or when the calf is unusually weak, such helps are sometimes effective, but in ordinary cases, when the calf is strong and labour normal, unaided nature is sufficient. If, however, the calf is deprived of the natural stimulation afforded by the mother's tongue, the attentive herdsman will lose no time in rubbing it well with wisps of straw, until it is as dry as it can be made by that process in moderation, and he should take care to imitate the cow's instinctive habit by rubbing along the back, and especially giving a series of rubs against the grain, that is, from between the hips forward to the shoulder. If at the moment of birth, or within a few seconds afterwards, the calf, although showing signs of life, is unable to inhale, the artificial respiration by salt and blowing and by smart heavy slaps with the flat palm of the hand on the sides of the calf's chest, turning the calf over if necessary to slap both sides. Some herdsmen use the bellows to blow down the throat; but

care is necessary in this operation to avoid injury to the calf. Such an instrument, if occasionally useful in skilled hands in cases of urgency and extreme danger, should not be used by an ignorant man. When cows of very great value are about to calve, unless either the owner superintending in person or his managing representative have adequate knowledge, both theoretical and practical, of the proper treatment of ordinary cases of difficulty or danger, it is safest to have a duly qualified veterinary surgeon on the spot, or within easy call. All herdsmen, in these days of technical education, should be able to deal with not only cases of the nature of those already mentioned, but also such as wrong presentations. The latter, being connected with veterinary work rather than with the department of management, need not be discussed here; yet a skilful manager should know something of what can be done in many cases until the services of the professional practitioner are obtained. Our fourth class of details is relative to the rearing of young stock.

One system is to remove the calf as soon as the cow has licked it, and to feed it three times daily until a week old, with about one quart of skimmed milk; the quantity increased up to two gallons daily, and the calf, if with others, tied up before and after feeding, a precaution, no doubt, against mutual sucking and consequent hair-balls. But as the calf naturally wants to suck something, it is kept appeased, and at the same time made to acquire a new taste, by having a small piece of linseed cake. As soon as it is thus taught to eat, it has a mixture of bran, bruised oats and linseed cake dust; at two months old the calves go out an hour or two daily in a paddock, the time being lengthened as they advance in age; but care is exercised to keep them in until the dew is off the grass, and to take them in from the heat of the summer day. For scour one table-spoonful of castor oil at night and one of carminative chalk in the morning. In autumn, hay, bran and cake are given at night; later, a few carrots or swedes ppuled with hay chaff; a loose shed with a yard for winter

helps to gradually harden them to our climate. The heifer produces her first calf when she is about two years old. Another system is to let the female calf suck the dam two or three weeks, bull calves intended for rearing as sires, a little longer, both weaned on warm skimmed milk and artificial food, and as they advance getting chopped hay with meal (oat, barley, bean or pea) and a little oil-cake, the bulls getting the larger rations. A partially covered yard or a yard with sheds is best for the young stock; the young bulls should walk out every day. Heifers calve at two years old. Another: the heifer's first calf suckled by its dam for six weeks, and gradually weaned; calves from cows (that is to say, all after the first calf) brought up by hand and taught to feed early. Another: The heifer allowed to suckle her calf from two to six weeks to develop the udder and teats. Cows' calves usually taken from the dam at birth. All calves when taken from their dams have new milk two or three months, then half new and half skimmed milk for a short time, and skimmed milk only until the age of six months. Weak calves have new milk longer than others, and a little other food as may be necessary. From six months until fit for service (from twelve to fifteen months old) heifers have pulped roots with a little barley meal and bran, and a handful of hay at night. The heifers are turned out to graze daily, whatever the weather (this is on the south coast of England), and at night return to an open shed littered with barley straw. Another: Calf (cow's or heifer's) with the dam a week, more or less, according to its strength; weaned on new milk for a month; warm skim milk with beans or peas and hay until four months old, then milk reduced and sliced mangolds given; out to grass in a mild season, with a shed for shelter, and have a little cake or corn; at eight months old early dropped calves live on the pasture; later born, housed at night in severe weather, and get hay and roots. Yearlings wintered in an open yard with a shed, and have a few roots, or cake and hay. The foregoing are a few representative

Sturtevant's herd of Ayrshires in Massachusetts averaged in one year 2,812 quarts of milk, and on an average of eight years 2,341 quarts in the year from each cow, whilst in the best dairy districts of New York the average of ordinary cattle was not more than 1,300 quarts, in superior herds 1,800 quarts, and in the best dairy herds of the best dairy regions not over 2,300 quarts.

In England, a few years ago, a milk register of the pedigree Shorthorn dairy herd of Mr. I. N. Edwards, of St. Albans, was systematically kept, the percentage of cream taken and the milk occasionally tested by the analysis of samples. The tabular statement for the year 1882, which happens to be at hand, separates the cows from the first-calf heifers. The average daily yield of each cow, from the date of her last calving to the close of the year, was 8·4 quarts of milk. One cow which had calved so long before as the 17th of August, 1881, and had been scarcely a month dry at the close of 1882, had given within the latter year 3,922 imperial quarts of milk in 336 days, averaging 11·64 quarts daily, with more than four of the earliest and best months of her milking period lopped off as belonging to a previous year. Percentage of fat varied from 2·16 to 3·99 and averaged over 2·84. The first-calf heifers were more equal than the cows in their percentage of butter fat, although their average quantity, 2·62, is a trifle less than that of the cows.

The system of record-keeping adopted by Mr. E. C. Tisdall, of the firm of Tunks and Tisdall, West End, London, dairymen, and farming at Holland Park and Epsom, was to have the cows milked into cans or pails with handles over the top. As the milk was carried out of the byre it was hung upon the hook of a weighing machine at the door, and the weight instantly marked opposite to the name of the cow, on a list behind the door. At the end of the week the quantity found to the credit of each cow was entered in a large book in the office, and so from week to week the yield was recorded. Tests of quality were occasionally used, and the length of the

milking period was found from the number of weeks and days each cow had figures to her credit. The herd at first consisted of common Shorthorn dairy cows, which were always put to a registered Shorthorn bull and the heifers reared. As these came to profit, Mr. Tisdall discovered an increase in the production of milk and butter; and as further pedigree crosses were added, the increase was shown to be constant and steady. Pedigree Shorthorn cows were therefore added to the cows with from one to three or four crosses of pedigree bulls upon common cows originally purchased, and the herd in course of time became one almost wholly of well-bred Shorthorns; but they were always reared and trained for milking, and any not up to the mark were quickly weeded out.

The following particulars of the dairy produce of the large herd of Red Polled cattle at Whitlingham, Norfolk, are extracted from the carefully and minutely kept records of Mr. Garrett Taylor, who since February, 1887, has systematically noted the daily yield of each milking cow and heifer. The herd is kept principally for the sale of milk, and consequently the quality of the milk has not been under the same close and accurate notice as its quantity. But, without being able to give statistics of the quantities of cream and butter, Mr. Taylor has confidently asserted that the milk is only less rich than that of Jersey and Guernsey cows. At one time, when he had to buy a few cross-bred Shorthorn cows to meet a large order for milk, the Norwich consumers at once began to complain of the quality supplied. The milk of the cross-bred cows was at once carefully tested in tubes, together with that of the Red Polls, and the result was at least 10 degrees more cream from the milk of the Polls than from that of the cross-bred cows. The food of all had been alike (consisting of good swedes, sound hay and sweet ensilage, linseed and decorticated cotton cake, condiment, meal and malt, without grains or common milk-forcing food) except that the Polls had only one-third the quantity of artificial food allowed to the cross-bred cows.

When the British Dairy Farmers' Association visited Norwich in 1888, the milk at their request was submitted to analysis after the cows had been turned out night and day on sewage grass alone. These tests were taken at three different times, in different states of the pasture, after drought, and after rain, and gave, in comparison with the tests of other breeds elsewhere, ample confirmation of Mr. Garrett Taylor's opinion of the quality of the milk and the butter-producing capabilities of the breed. The quantity was not only large in the aggregate of each cow's yield between calvings, but was well distributed over the time the cow continued in milk. It was not a sudden flush and a falling-off, but steady good milking. One cow, from four years old, yielded in thirty-three weeks 6,836 lbs. of milk, of which the total yield in the thirty-third week was 141 lbs. Another, five years old, gave 7,011½ lbs. in thirty-two weeks. A third, also five years old, whose record reached from February 1st to December 1st, 1887, yielded 6,172 lbs.; and from January 12th to November 1st, 1888, gave 6,904 lbs.; and a fourth, four years old, calving January 5th, 1887, had her record taken from February 11th to January 6th in the following year, when she was within a week of calving, in which time the total was 8,379 lbs. She calved again on January 13th, 1888, and from the second to the thirtieth week after calving averaged weekly 160 lbs. of milk.

Mr. R. Harvey Mason, of Necton Hall, Swaffham, Norfolk, whose records have been kept accurately for several years, showed in twelve months of 1890-1 an average of 325 days as the milking period of twenty cows, each cow yielding an average of 4,929 lbs. of milk in the year. In 1891-2, twenty-four cows were milked, but as four were "heifers" (first-calf cows) which did not exceed six months each in milk, they were left out of the account as unfairly lessening the average. The averages of the twenty in that year were 298 days in milk, and 5,133 lbs. of milk (fractions omitted) from each cow. In 1892-3 there were 27 cows, and the different stages of life

are somewhat carefully indicated. Six were milking "heifers" or first-calf cows, two of them only two years and a-half old, and one was an aged cow sold within the first three months after calving. That cow, and four of the heifers which were less than six months each in milk, are omitted from the record, so we have twenty-two cows, two of which were in their first milking period in the record, which gives the averages of 295 days in milk and 5,258 lbs. of milk. In 1893-4, omitting again four short time (first-calf) milkers, we have, from a total of twenty-six in the milking herd, again twenty-two taken into the account. The highest record of that year is 7,901 lbs. of milk given in 364 days, making a daily average of 21·70 lbs., and the same cow's milk showed a percentage of 4·3 of butter-fat. The averages of the twenty-two are 317 days in-milk and 5,010 lbs. of milk from each cow. The percentage of butter-fat, taken with Babcock's tester, averaged in the same year, but upon the entire herd of twenty-six cows, old and young together, 3·9; the highest percentage 5·0, and fourteen of the twenty-six reached or exceeded 4 per cent. The quantity thus indicated proved to be within 50 lbs. of the actual weight of butter produced, without allowance for milk sold. The year of record ends on the 31st of March, and the weight of milk is found to be about 10 lbs. to the gallon. This is a little short of the estimate of a good authority mentioned in an earlier chapter, whose wide and general experience enabled him to fix the weight of a gallon of average milk at about 10¼ lbs.; but the difference is obviously in harmony with the results of these tests in the high average of butter-fat, and with Mr. Garrett Taylor's belief that the milk of the Red Polled cows ranks next to that of the Guernseys and Jerseys, which is found to weigh about 10 lbs. to the gallon. An item of important information in connection with the relation of these dairy records to the subject of management, is the statement that the cost of feeding (given in detail under the table of records for 1892-3) averages about £8 6s. 6d. for that year, but in 1893-4, owing

to the dry summer, about £1 for each cow was added to the cost for oats supplied to the cows in the months of August and September, when in ordinary seasons the cows have grass alone.

We have seen in Chapter II., section 4, that in the oldest authentic accounts of the Devon breed, as it existed in the West of England in the latter half of the last century, the dairy properties are put at a very low estimate. Ox labour and beef were the great objects of the breeders. Occasionally, nevertheless, under favouring conditions a cow considerably above the average of the breed as a milker was found; and by selection and management, on lands favourable to the production of milk and butter, Mr. Coke (afterwards Earl of Leicester), at Holkham, in Norfolk, Mr. Conyers, at Copt Hall, in Essex, and other breeders, succeeded in establishing excellent dairy herds. In the great dairy county of Dorset the Devon has been long adopted as suitable to the butter-making districts, under the system of dividing a medium-sized or a large herd into two, three, or more "dairies" and letting those "dairies," with the requisite land and accommodation, to dairymen, by the year, at the rate, latterly, of £11 or £12 for each cow. The same system may be seen in operation in the district of North Devon from about Tiverton to the border of Somerset. Mr. Alexander Watt, the author of an instructive manual on *Dairy Farming in Devonshire*, to which a £50 prize given some years ago by Mr. Seale-Hayne, M.P., was awarded by the Devon County Agricultural Association, gives the results of a series of experiments organised and carried out by himself as the managing agent of the Directors of Convict Prisons, at the Government Farm, Princetown, South Devon. The breeds he selected for comparison, under tests of their value for that particular place, were the Shorthorn, Ayrshire, Jersey, North and South Devon, and one or both of the Scotch Polled breeds. His results convinced him that for a Devonshire dairy, Devon cattle are the best. Three North Devons, of a good milking sort, he

found, could be kept during the milking period on food exactly equal to that required to support two Ayrshire or two Shorthorn cows in milk for the same length of time. Each Devon cow gave him weekly from 1½ lbs. to 2½ lbs. more butter than either a Shorthorn or an Ayrshire cow; and when these cows, if they failed to breed or were not intended for further use in the dairy, were drafted off for grazing, the Devons were in the best condition. The Polled Scots were in most particulars about equal to North Devons. Their milk was quite as rich as the Devon milk, but not quite equal to it in quantity in the daily average whilst the cows were in milk, and their milking period was a little shorter than that of the Devons. To the Jerseys he does the justice to say that in a suitable climate they can beat every other breed in richness of milk, and he would give them also the first place for quantity (a questionable admission), but his *proviso* that the climate must be suitable suggests the question whether the Jerseys used by him in the experiments were fully acclimatised specimens of their breed. In such tests of breed against breed, one great obstacle in the way of satisfactory evidence is the uncertainty, generally, and perhaps in some degree in all cases, as regards the relation of the average merits of the selected specimens of each breed, to the average merit of their breed. Suppose the trial to comprise four breeds, which we will distinguish as A, B, C, and D, and suppose further that it were possible to accurately classify each breed in seven orders of merit, order number one being the highest, and number seven the lowest order of merit. If the cattle of breed A selected for the experiment either all belong to order 3, or make an average of order 3, say two of order 2, two of order 3 and two of order 4, it is only fair that the specimens of breeds B, C, and D, selected to compete with them, should be of order 3 of their respective breeds, either wholly, or by an average taken in the same way. Now, even if the selections were made by the best judges of each of the respective breeds, and the difficulty of

accurately classifying the whole breed in seven orders of merit were surmounted, does not every man possessing practical knowledge of cattle at once see the difficulty of saying with assurance that every one of a certain number of animals selected by him belongs to the third order. Say there are half-a-dozen of each breed: why, every man who has done his own marketing when he required fresh stock knows how some animals exceed, and others disappoint, the buyer's expectation. One chosen as third-class must go down into the fourth or fifth class, when judged upon its performances; another, also chosen as third-class, proves at least second-class, in real usefulness; and that is the point, when the profitable qualities of a breed are upon their trial. Thus, under the most favourable supposition, that a specialist in each breed makes the selections from each, we have plenty of room for uncertainty. Whereas, if one buyer, not equally expert in his judgment of all the breeds to be tried, does the whole of the selection for the purposes of the intended trial, the chances of accuracy are still more remote. To suppose one judge equally competent to select cows of the third order of breeds A, B, C, and D, is to suppose a great deal. Unless the supposition were fully verified, the claim of exact fairness must fall. Moreover, if the most exact fairness were possible, and the choice of cows had been made with absolute precision, some of those lots of cows for trial are brought from distant parts of the country and placed under conditions to which they were not previously accustomed. The dairy produce from such cows, and their rate of consumption of food, might be very much affected by the change, so that a cow rightly selected as representing order 3 might fail to qualify for a higher place than 4. Many other suggestions of influences possibly affecting the fairness of the experiment might be offered, but would occupy too much space here. Trials like those of Mr. Watt at Princetown are valuable so far as they go. In this case the result was that which occurs in perhaps nineteen-twentieths of experiments of the same

kind, in whatever country or district they are carried out—a true verdict in favour of the local breed.

From the results of a multiplicity of tests, however, making due allowance for the chances in favour of the breed already adapted to local conditions, and for the chances of inequality in the representation of breeds, we might gather serviceable information. Each experimenter, who, like Mr. Watt, brings out the capabilities of six or seven breeds under certain conditions, is a contributor to the general store of knowledge. If we could have notes like his from a sufficiently large number of breeders as competent as he, we should possess something like data for an estimate of the comparative merits of different breeds for various purposes and localities. Mr. Watt's details are useful, and his testimony upon one or two disputed points derives value from his long and varied experience. His opinion, founded upon facts accomplished under his own management, that the excellent dairy cow need not be an animal of low value to the grazier and the butcher, nor the beef-making cow one of little use for the dairy, but that milking and beef-making may be combined in the individual animal, and, by selection and management, in the breed generally, should outweigh many denials of the possibility of such combination. Many breeders may have failed to effect the combination and balance of the grazing and dairy properties, but if one breeder has succeeded, his success is a sufficient answer to the theory built upon the failures of other breeders.

Three vital points in the management of stock, emphasised in Mr. Watt's manual, are ventilation, drainage, and light. Pure water and plenty of exercise are esteemed necessary, and salt should be used to keep the animals in health. Lumps of rock salt placed where the animals can lick them at will, (and they are often willing), are recommended, and cleanliness is reckoned one of the first necessities of healthy life.

We have the little dairy breed, which, although classed among the mountain breeds of cattle, has been so improved by attention to the udder and by treatment tending to the gradual

development of dairy properties, that even upon the scanty pasturage of the mountain slopes of Kerry it can yield a rich return, and when brought to better lands or fed on artificial food conducive to the increase of its powers, can do wonders; and its little cousin, the Dexter, is perhaps still more adapted to improved lands and high feeding systems. These are dealt with in the department on breeds, and mentioned here again as illustrations of what may be done by close attention to any one object in the management of cattle, even under unfavourable natural conditions.

With reference to the management of Jersey cattle, much valuable information is given in the volume prepared by the English Jersey Cattle Society, and published by Messrs. Vinton & Co., London.

CHAPTER VIII.

DISEASES OF CATTLE.

[*This chapter has been written by Professor J. Wortley Axe.*]

A knowledge of the common ailments of cattle, their origin and mode of spread, as also their prevention and means of relief, is indispensable to successful herd management.

In the following notes on the diseases affecting this division of live stock it is intended to afford the farmer such information as may enable him to deal promptly and rationally with such cases as may from time to time occur, pending the arrival of professional assistance.

CHOKING.

The arrest and impaction of food and other matters in the gullet is an event far more common in the ox than any other of our farm animals. The greater liability of cattle to choke is in part due to the nature of the food on which they subsist—and this has reference more especially to roots—and in part also to the fact that the food is returned to the mouth a second time in the act of rumination.

The mishap occurs most frequently when hungry cattle "bolt" their roots in an imperfectly masticated state, or when coarse dry provender is similarly dealt with. Foreign agents contained in food, such as thorns, pieces of stick, nails, &c., are among the occasional causes of choking.

Diseases affecting the gullet itself—as when wart-like excrescences grow out of the lining membrane, or when stricture

of the tube follows upon injury—render animals liable to the mishap.

Symptoms.—The symptoms of choking vary somewhat with the position of the choke. This may occur in the throat or in the course of the neck, or in that part of the tube which passes through the chest. When in the throat the head is "poked" out, there is difficulty and pain in swallowing, saliva flows freely from the mouth, and a cough is heard more or less frequently depending upon the site of the impaction. If the impediment is in the neck a bulging is seen on the left side in the course of the gullet where the offending matter may be felt. In all cases the animal ceases to ruminate, and sooner or later the stomach becomes distended with gas and the breathing is rendered difficult in consequence. Choking is sometimes attended with attempts to vomit and frequent eructations of gas from the stomach.

Treatment.—When the obstructing mass is in the throat, its removal may be effected by passing the hand into the mouth, through which it may be reached and withdrawn. When occurring in the course of the neck, a little olive or linseed oil should first be administered, and the gullet manipulated from the outside with the object of breaking up if possible and moving the offending mass from its position. A little upward and downward pressure alternately, will sometimes suffice to dislodge it. Failing this, and in those cases also where the impediment is lodged in the chest, the probang or "choke-rope" must be resorted to. Here it is necessary to exercise care lest injury be done to the passage. Before introducing the instrument into the throat it should be well greased, the head should then be extended or straightened on the neck, and the probang passed along the mouth into the gullet until the obstruction is reached, when pressure is to be applied until it is displaced. On no account should the force used be jerky and spasmodic, but a steady and continuous pressure. After the animal has been relieved, all food should be withheld for several hours, and for the

following two days the patient is to be placed on sloppy diet. Should the employment of reasonable effort fail to dislodge the choke, nothing remains but to open the passage from the outside and remove it.

TYMPANITIS—HOVEN, BLOWN.

Tympany, or drum-belly, as it is sometimes called, consists in a distension of the first stomach, or paunch, with gas. Ruminants are especially liable to it, owing perhaps to the complicated nature of their stomach and the necessity which exists for a second mastication of their food. Although in severe cases death may follow an attack of this disorder, the malady is usually amenable to measures of treatment when promptly and judiciously applied.

Causes.—The causes of hoven have reference either to the nature of the food or to impairment of the digestive function, and often perhaps to both combined. Many animals suffer from this affection when first turned to pasture in early spring, and especially so if at the time they have undergone a long fast or been insufficiently fed, or performed long and fatiguing journeys by rail or road. The possibility of the disorder arising is considerably increased when the grass is wet and rapidly grown, or if it be bolted without sufficient preliminary mastication. Young rapidly grown clovers when covered with dew produce it in its worst form, and we have known it to result from the excessive use of potatoes, and stale grains. All these juicy descriptions of food have a tendency to undergo fermentation, and especially under the influence of impaired digestion. Hoven is a common consequence of choking; here the impediment in the gullet prevents rumination from being carried on, as a result of which the food is confined in the paunch, the order of digestion is interfered with, and under the influence of heat and moisture, fermentation and decomposition result in the formation of various gases, of which carbonic acid, sulphuretted and carburetted hydrogen are the

chief. Some animals suffer repeated attacks of hoven at longer or shorter intervals. Where this is so some chronic disease of one or another of the compartments of the stomach may be suspected, or it may result from chronic disease of the liver, and in young cattle from the existence of hair balls in the paunch. There is also reason to believe that where the saliva is deficient in quantity, owing either to functional or structural defect of the salivary glands, the same periodical disturbance may take place. Hoven arising in the oourse of protracted choking is relieved when the "choke" is removed.

Symptoms.—The symptoms of tympanitis may be sudden in their onset or slowly progressive. In either case the main feature of the disease is a swollen state of the abdomen, generally expressed by the term "blown." The enlargement is more especially marked in the left flank, to which point the rumen inclines. If pressure be made with the hand over this region, the belly is found to be tense and elastic like an inflated bladder. If the part be struck with the fingers, it emits a hollow drum-like sound—these symptoms together indicate the presence of confined air. Pressure of the enlarged stomach on the chest impedes the play of the lungs and gives rise to difficulty of breathing, which may become very considerable and threaten suffocation. In this condition the animal obstinately stands with the head extended, the eyes staring, the mouth widely opened, and maybe the tongue protruding. Small quantities of offensive gas escape from the stomach, and saliva issues from the mouth in ropy strings. The bowels are irritable and repeatedly act, but the quantity of dung discharged is inconsiderable. In the latter stages of the disease the patient becomes dull, stupid and listless, sometimes excited or even frenzied. With the increasing size of the stomach pain is expressed by grunting and grinding the teeth, and occasionally the head is turned towards the flank.

Treatment.—In this disease the indications of treatment are two, viz.:—to remove the offending gas from the paunch and

to prevent its re-formation. If the amount of air present in the stomach is not large, three or four ounces of aromatic spirits of ammonia given in a quart of cold water and repeated in two hours may suffice to remove it. The second dose should be given in conjunction with a full dose of Epsom salts and ginger.

In the event of the mischief continuing, the aid of a veterinary surgeon should be sought who will introduce an instrument designed for the purpose into the paunch, and draw off the gas. He will likewise prescribe necessary measures for preventing further decomposition of the food, and thus arrest the disease. For twelve hours after the acute symptoms have subsided the patient should be kept without solid food. Thin linseed or oatmeal gruel may be allowed without stint, and for the following two or three days the diet should be cut down to half rations and restricted to sloppy food, such as bran mash with a little scalded hay chaff and pulped turnip. A little salt aud cattle-spice may also be added to each meal and continued for a week or so after convalescence.

Plenalvia—Distension of the Paunch with Food.

Besides being inflated with gas as a result of decomposition, the paunch is also liable to become unduly distended with food. In both instances the disease is marked by enlargement of the body, but, as we shall see, they are readily distinguishable one from the other.

The cause of the malady may be referred either to impairment of the function of digestion generally, in which the rumen is involved and sympathises, or it is the result of overfeeding after a long fast or after a change from indifferent to good and appetising food. Grain, such as wheat, barley, and new oats, when taken in excess with young, succulent grasses or potatoes, are very liable to induce it. Here the distension does not immediately result from the ingested aliment, but only after the overburdened stomach has failed for a time

to carry on the process of rumination or cudding. As a result of this the food undergoes fermentation throughout its entire mass, and the paunch is consequently distended and paralysed.

Symptoms.—Dulness and loss of appetite are the symptoms first noticeable at the onset of the disease. Swelling of the abdomen generally, and on the left side in particular, then appears, and at the same time rumblings of the stomach are heard and occasional discharge of gas by the mouth. When the bulging part of the left flank is pressed upon by the fingers, the over-distended paunch is felt to pit, very much after the manner of a piece of dough, and when the part is struck with the hand, the drum-like sound so marked in hoven is altogether absent. As the stomach enlarges, the play of the lungs is interfered with and breathing becomes quick and embarrassed. In this disease, as in hoven, pain is denoted by grinding the teeth, grunting and moaning. In the advanced stage of the affection the patient obstinately stands, or should the animal lie down the body invariably rests on the right side.

Treatment.—Here the object of treatment should be to restore tone to the paralysed rumen and cause the speedy removal of its contents. For this purpose, two to four ounces of aromatic spirits of ammonia with twelve to twenty ounces of Epsom salts may be given in two quarts of thin cold gruel. After two hours this should be followed by a drachm of carbolic acid rubbed up in a little soft soap and given in three pints of cold water. Should medicine fail to produce any reduction of the body, then the paunch may require to be opened and its contents removed by an expert.

Impaction of the Omasum—Fardel Bound—Chill Bound —Maw Bound.

The omasum, or third compartment of the stomach, known as the manyplies, is very liable to be impacted or unduly distended with food. Here it becomes dry and hard and

immovably fixed in the compartments into which the organ is divided. In this disease the function of the stomach is impaired or arrested, and the onward passage of the food interfered with. If the organ is not relieved inflammation results, and may extend to the fourth stomach with fatal consequences.

Causes.—Impaction of the omasum is frequently the result of functional disturbance of the organ itself. This is seen in the case of diseases affecting other divisions of the stomach, and in specific fevers, such as cattle plague and foot and mouth disease, in all of which there is a tendency to undue fulness of the third stomach, and to abnormal dryness of its contents. For the most part, however, it is a dietetic disease, and follows upon the continued use of coarse, dry and indigestible food, and especially such as is of inferior quality. Where the water allowance is insufficient, as in dry summers, or where the supply is irregular, liability to the disease is increased. It is sometimes seen to follow the ingestion of old coarse herbage left for autumn feed. Cattle pastured on poor park land suffer when in the autumn they consume, in addition to grass, the leaves and fruit of the oak and beech and other matters containing binding principles. Impaction of this organ is a common feature of acorn-poisoning, and invariably exists in poisoning by lead.

Symptoms.—Although the disease is attended with marked indications of pain and suffering it is by no means one in which the symptoms point directly to the organ affected, and it is only by the fullest consideration of all the circumstances of the attack that the veterinarian is able to arrive at a satisfactory diagnosis. Dulness, an indisposition to feed (loss of milk in the cow), and suspended rumination, are the first indications of disease. The bowels are inactive, and should fæces be voided, they are hard, dark in colour and coated with mucus. The animal is dull, the coat stares, the head is held low, and the face wears an expression of pain. In some instances, irritation of the bowels follows upon constipation,

when the discharges become soft or semi-fluid, and are voided in small quantities. During the attack the animal shows no disposition to move, but obstinately stands, or lies with its head extended on the ground. As the disease progresses pain is denoted by grinding the teeth, and looking towards the flank, and a deep grunt is emitted with each expiration. Sympathetic brain disturbance results if relief is not given. This may either take the form of extreme drowsiness and unconsciousness, or the patient becomes excited and furious.

Treatment.—The first and chief object to be overcome is the impacted condition of the stomach, as upon this depends the success of treatment. The bowels must be freely acted upon. Bold doses of purgative medicines are required here, and a good deal of judgment and experience in the selection and combination of a remedy is wanted. Among the medicines employed are Epsom salts, croton seeds, aloes, linseed and castor oil and various combinations of two or more of them. To a large full grown beast, twenty ounces of salts and four drachms of aloes may be required to move the torpid bowels to action, and with it may be combined two or three ounces of tincture of cinchona. Should the bowels not respond to the aperient dose, professional assistance should be called in, when the desirability of fomenting or blistering the belly will be considered, as well as the quantity and kind of purgative agent to be next employed. A good deal of benefit will be derived from a plentiful supply of thin linseed gruel, which if not taken voluntarily by the patient must be freely administered three or four times a day.

Where brain symptoms appear cold water in the form of spray or douche should be applied to the head and continued for an hour at a time, or ice bags may be substituted, and it may be desirable to abstract blood from the jugular vein. In this, as in all other stomach affections, the most careful dieting will require to be observed for some time after convalescence has been established.

Gastro-Enteritis.—White Scour in Calves.

Inflammation of the stomach and bowels is what is understood by the term gastro-enteritis, which is also commonly spoken of as "white scour." The mortality from this disease is very considerable, and in some instances amounts to from 30 to 60 per cent. of the produce. In the majority of cases it is doubtless the result of common dietetic influences, but we have reason to believe that in some others it is of a specific contagious nature, and consequently communicable from one calf to another. In this connection it has been noticed by the writer that calves have given evidence of the disease immediately after birth, by which it may be inferred that the cause, whatever it may be, is in some way connected with the bodily condition of the dam.

Causes.—Among the common causes to which scour can be referred, overcrowding and badly ventilated, ill-conditioned "pens" are not the least harmful. The practice of allowing manure to accumulate in calf houses and give off its foul vapours without means of escape, is largely responsible for the virulence and fatality which this affection sometimes assumes.

Stale unwholesome milk fed out of dirty pails irritates the delicate stomach and bowels of the young, and provokes diarrhœa; especially is this the case where calves, after long fasting, are allowed to gulp down their meal without restraint.

The danger becomes still greater when to fasting is added fatigue and exposure, as occurs in calves carried from market to market in the course of trade.

Sudden transference from the teat to the pail is not less to be condemned. The natural and steady stream supplied by the one cannot with safety be immediately and completely replaced by the other. To obviate danger of this kind the change must be gradual and carefully made.

Where the disease arises in sucking calves the cause will frequently be found in some deleterious state of the milk resulting from feeding and general management of the dam.

Here, sudden changes from manger food to grass or to other varieties of aliment, water contaminated with decomposing organic matter, roots and their leaves in a state of decay, the excessive use of cotton cake, ill-prepared ensilage, mouldy fodder, are all capable of imparting to the milk irritant properties when fed in large amount or over long periods. The milk of stale cows will often affect the health of young calves prejudicially, as will that of cows in poor condition. Fright, excitement, and fatigue, such as result from railway journeys and exposure in markets, often unfit the milk for the delicate stomach of the calf.

Symptoms.—In this disease the bowel discharges are in a liquid condition, and of a white or yellowish-white hue. Now and again small masses of dense undigested curd are voided with them as well as a thick slimy matter (mucus) and sometimes blood. The evacuations emit a foul pungent odour which alone marks the presence of the malady in a shed. The fæces are voided frequently, and the act is attended with considerable straining and pain. The animal quickly loses flesh, is feverish and weak. When standing, the back is arched and the belly tucked up, but when severely affected it is mostly found lying down with the nose doubled in to the flank, moaning and grinding the teeth.

Treatment.—In a large majority of cases of scour a dose of aperient medicine is called for. This may take the shape of two or three ounces of castor oil with thirty drops of tincture of opium, and a little peppermint water. Having removed the undigested matter contained in the bowels, relief from existing pain may be afforded by a further dose of tincture of opium, with which may be combined a couple of drops of carbolic acid, the whole to be given in well boiled milk with which an egg has been beaten up. The patient should be placed in a warm, dry, well ventilated pen, well littered down. Should the pain continue, the medicine last prescribed may be repeated two or three times a day, and in the intervals a little carbonate of soda and lime water may also be given in a little milk.

To prevent the disease is to guard against those causes to which we have referred. Where contagion is suspected, isolation, thorough cleansing, and disinfection, with efficient ventilation and drainage should be provided.

MAMMITIS—DOWNFALL OF THE UDDER—GARGET.

The almost morbid activity to which the mammary gland of the cow has been brought by selection and cultivation, and the immense size to which it has consequently developed, have very considerably increased its liability to accident and disease. The ailment from which it most frequently suffers is that form of inflammation which is commonly spoken of as "Garget" or "Downfall of the Udder."

Mammitis, although not a disease which threatens the life of the cow, is, nevertheless, one of considerable importance to the dairy farmer, both from an economic as well as a sanitary point of view. As to the first, it tends to impair or destroy one or more of the quarters, and to diminish the milking capacity, while in respect of the other, it contaminates the milk with inflammatory products (matter) and may prejudicially affect public health. This disease has been said by a distinguished medical officer to have caused an epidemic of diphtheria in man. The evidence, however, on which the allegation was based, was investigated by the writer at the time, but, as in the case of so-called cow scarlatina, there appeared to be no foundation for any such conclusion. Commonly mammitis occurs when the gland is in a high state of physiological activity, as during the first few weeks after calving, and in the experience of some, heifers are more liable to it than older cattle.

With rare exceptions the disease is confined to one quarter, although two or all of them may be simultaneously or consecutively affected.

Causes.—Bad milking, or imperfect emptying of the gland is, perhaps, the most common cause of the disease.

Many cases result from overstocking—a cruel practice adopted by dealers to swell the bag and give it an attractive appearance for market purposes. In these instances animals are allowed to go for many hours without being milked, when the udder becomes distended and painful, in which condition inflammation is readily provoked, unless timely relief is afforded.

External violence, such as blows, and forcible compression or squeezing, is not unfrequently found to induce it.

It also results from exposure to cold easterly and north-easterly winds while the udder is distended and the body heated.

High living and a full habit of body (*plethora*) are said by some to excite the disease. In large numbers of instances no cause can be assigned for it.

In foot and mouth disease when the specific eruption appears on the teats, as it sometimes will, and in cow-pox, mammitis may result from an extension of the inflammation upwards along the milk duct. We have known this disease to appear in a herd as if on some occasions it possessed infectious properties.

Symptoms.—Inflammation of the udder is recognised by an increase of size, and unnatural firmness. Pain is excited when the gland is pressed, moreover it is abnormally hot and the skin is reddened. As the swelling progresses the animal moves with a straddling gait; the milk from the affected gland has now become of the character of water, and with it small flakes and lumps of curdy matter may be squeezed from the teat. Later on pus and blood make their appearance, or the channel of the teat may become altogether blocked with the solids of spoilt milk. Should not relief be afforded the formation of an abscess may be looked for, or the whole or part of the gland may die and slough away. Although the inflammation may be caused to subside without inducing the last-named result, there often remains a chronic enlargement and hardening of the quarter, with more or less

Treatment.—When treatment of this disease is promptly resorted to and thoroughly carried out, the bad results referred to above are seldom observed. A bold dose of aperient medicines is the first requirement. The gland should then be slung by placing beneath it two or three folds of flannel, which may be drawn up by strong tapes carried over the loins and quarters, and tied together across the back and root of the tail. Four holes cut into the flannel will allow the teats to occupy their natural position. Hot fomentations should now be applied to the affected parts three or four times a day, and after each occasion the flannel suspender should be made dry and warm before being applied. The milk should be frequently and carefully drawn from the affected quarter, and it may be necessary where any obstruction exists to pass a probe along the duct to remove it. This is an operation needing care, and is best entrusted to a qualified veterinary surgeon. Bleeding is sometimes practised, but here again the necessity for the operation is a matter for the expert. Animals suffering from this affection should be put on half food rations, consisting of bran with roots, a small allowance of hay chaff, with which should be mixed a little salt and about 2 ounces of linseed oil. When the acute inflammation has subsided, belladonna liniment may be freely rubbed into the affected quarter twice or thrice a day.

PARTURIENT APOPLEXY—DROPPING AFTER CALVING.

The disease to which these terms have been given is an affection of the brain and spinal cord, the vessels of which, for reasons we do not understand, become unduly filled with blood and in some instances allow their contents to escape into the substance of the nerve centres.

It is to this condition of things that the paralysis and loss of consciousness which form such conspicuous features of the malady are due. Parturient apoplexy is particularly liable to attack the more highly bred and highly fed classes of milch

cows, such as the Jersey and dairy Shorthorn, and especially such as give large quantities of rich milk. The disease seldom appears until after the birth of the third calf, when the milk gland has reached a high state of development, and it is at the same time curious to note how rarely it follows upon protracted and difficult labour. Cows having once suffered from the disorder are predisposed to a second attack, to which they mostly succumb.

The exciting causes of the malady are not well understood, but it has been found to follow upon cold, indigestion, and over feeding, and some—though erroneously we think—have assigned to it a place among the contagious disorders.

Symptoms.—From twenty-four hours to three days after calving is the time when it may be expected to appear. Its onset is usually sudden, and little is known of its oncoming until the actual seizure sets in. Then it is observed that the cow ceases to feed and to cud, the secretion of milk is checked and the animal looks dull and lowering, or she may present signs of excitement, &c. Paddling with the hind legs and knuckling over at the fetlock joints next appear, soon to be followed by a rolling gait and finally inability to stand. Paralysed and helpless she falls to the ground, where she lies with the head turned towards the flank.

Treatment.—If, as is mostly the case, the animal is in high condition, early blood-letting may be resorted to with advantage, but it should not be practised in an advanced stage of the disease. A bold dose of aperient medicine should be given so soon as can be after the first signs of illness appear. For this purpose Epsom salts and aloes, combined with a little ginger, are the most suitable agents. Friction should now be applied to the skin by wisping and brushing, and the body clothed with woollen rugs first made hot before the fire. A full dose of stimulating medicine, such as spirits of ammonia or nitric ether, or in their absence gin, whisky or brandy, are now to be given three or four times a day, in plenty of thin gruel. The spine should be stimulated with

a liniment composed of turpentine and oil, and cold water or bags of pounded ice are to be applied to the head. It is important that the urine be removed from the bladder from time to time, and the patient turned over now and again.

The losses from parturient apoplexy have been much reduced since a modified form of the "Schmidt treatment" came into use about the year 1898. Much can be done to avert an attack by studying the temperature of a cow prior to calving. If after calving the temperature rises, ten drops of Fleming's tincture of aconite, given at intervals of three or four hours in a small quantity of water, will generally reduce it. If, on the contrary, the temperature goes down a stimulant should be given at once. If the animal drops hot air should be injected into the udder through the teats.

PLEURO-PNEUMONIA.

Pleuro-pneumonia is a specific infectious fever, essentially and solely a disease of the ox. Although it ravaged the herds of Great Britain for fifty years, at a cost to our farmers of untold millions sterling, it is of all others the most simple in its mode of spread and the most easy of extermination. Hitherto research has failed to bring out the cause with that clearness which belongs to other diseases of its class, but there can be no doubt that, like them, it has its origin in one or another of the various forms of bacteria or pathogenic fungi. The virus, in whatever form it may exist, is given out from the infected lungs of the sick, and to be effective in producing the disease must quickly enter the lungs of the healthy. It cannot, like the contagia of anthrax, tuberculosis, swine plague, and some other disorders, retain its virulence outside the body for a long period, but soon dies and loses its power of infection.

It is for this reason that cattle can only contract pleuro-pneumonia when brought under the same roof, or in close proximity with diseased stock. Infection cannot, as in the diseases named, be conveyed on hay, straw, water, and other

media. By cohabitation or herding together and by it alone, is the disease communicable from one animal to another. The period of incubation is irregular, but generally occupies from three to five weeks. It may extend over three months.

Symptoms.—The early symptoms of pleuro-pneumonia are very ambiguous, save that they indicate the existence of fever. Here a rise of body temperature two or three degrees is a noticeable feature. There is in addition dulness, a staring coat, impaired appetite, and a disposition to be alone. Occasional shivering may appear, and in milch cows loss of milk is soon observed. The evidences of lung trouble are:—Cough, at first only occasional and without pain, later it becomes more frequent and the breathing is attended with a short deep grunt at each expiration. Pressure applied between the ribs causes the animal to wince; knuckling over at the fetlocks is now seen, and movement, especially in turning, may provoke a painful moan. As the disease progresses, the breathing becomes laboured, quick and painful, the head is poked out, the mouth is held open, the tongue protrudes and the cough is short and frequent. If the ear be applied to the affected side of the chest, various sounds are heard, depending upon the state of the lung. These may be expressed as crackling, wheezing, whistling and rubbing sounds, one or more or all of which may be present at the same inspection. As the lung becomes spoilt and disorganised, impurities accumulate in the blood, when diarrhœa with foul-smelling discharges appears, followed by rapid wasting and death. Although generally fatal in its consequences, experience teaches that many animals recover from pleuro-pneumonia. When this occurs, a portion of the diseased lung is usually destroyed, and from it infection may be given out for months, while the animal itself presents the outward appearance of robust health.

Prevention.—As we have already indicated, pleuro-pneumonia is only capable of being spread by allowing healthy animals to occupy the same enclosure as diseased ones, or such as

have recovered from it. In the matter of prevention, therefore, it is only necessary to keep the one apart from the others to insure success.

Aphthous Fever (Foot and Mouth Disease).

Foot and mouth disease is a specific contagious fever. Its chief character is an eruption of vesicles or blisters in the mouth, on the feet, and sometimes also on the udder and teats. All our farm animals are more or less susceptible of the disease, and we have on several occasions known it to occur in the human subject as the result of drinking specifically infected milk. Its presence on a farm, therefore, calls for the greatest vigilance and care.

Cause.—The contagion in this disease, as in anthrax, tuberculosis, and other spreading affections, is doubtless a minute organism, but at present its identity cannot be said to have been clearly made out. The spread of the malady is effected by anything to which the contagion may cling or with which it may be mixed. Rats, cats, dogs, and poultry may convey it from byres to pastures, and from pastures to byres. Manure, straw, hay, and the boots and clothing of men tending sick cattle also act as carriers of the virus of the disease.

The milk of infected cows is often fatal to young calves, and especially if consumed while warm from the udder. The period of incubation varies from two to five days, but we have known sucking calves to die a few hours after receiving milk contaminated with the virus.

Symptoms.—Dulness, slight shivering, a staring condition of the coat and a rise of body temperature are the first signs of illness. This is soon followed by a discharge of ropy saliva from the mouth and lameness in two or more of the limbs. If at this time the mouth and feet be examined, vesicles or blisters will be seen. In the former, on the tongue or palate, or both; in the latter, at the junction of hair and hoof. They may also appear on the udder and teats. The blisters soon

break and expose a red raw-looking sore, which in the case of the feet may lead to inflammation and sloughing of the hoofs, unless due care is taken to guard against it. For a short time the appetite is impaired and thirst is considerable, but the desire for food soon returns. Soreness of the mouth, however, renders mastication painful, and it is for a time performed with difficulty.

Treatment.—The patient is to be placed on clean dry litter and have the feet thoroughly cleansed. A solution of alum or carbolic acid should then be applied to the ulcerated parts and repeated each morning and evening. This will have the effect of encouraging the wounds to heal and at the same time destroy the virus which escapes from them. Applications to the feet may be made by means of a garden syringe. For the first few days the mouth should be irrigated twice a day with a solution of alum or chlorate of potash. The affected animals should be kept in confinement if possible, so that the inflamed feet may be kept at rest and free from dirt as a precaution against an aggravation of the disease leading to sloughing of the hoof. Where an eruption appears on the udder it should also be dressed with carbolic acid solution. A plentiful supply of good food in a soft condition is needed for a few days, to which a little common salt may be added at each meal. Where the bowels are constipated and the fever runs high, a small dose of sulphate of magnesia may be given—either in the drinking water or as a draught—and repeated if necessary in twelve hours. Where, in consequence of soreness of the mouth, animals refuse to feed, the strength is to be supported by good linseed or oatmeal gruel, to which may be added a quart of good ale morning and evening. As a means of prevention it is desirable to keep all poultry and dogs in confinement, and to place the sick under the care of men who have no concern with other cattle. The litter from infected sheds and yards should be well dressed with carbolic

TUBERCULOSIS.

Tuberculosis is a specific contagious and infectious disease, to which all our domestic animals, without exception, are more or less liable, and although variable in the manner of its presentment in different cases, it is in all alike the result of the same cause, viz., a parasitic organism, the "bacillus tuberculosis," or as it is sometimes termed, the "bacillus of Koch." Of the several species of animals that go to make up our farm stock, cattle stand first in the order of susceptibility, and of these the milch cow suffers to a much larger exent than bulls, bullocks, and other descriptions of young stock. This disparity in the relative prevalence of the disease in horned stock is doubtless due to the favourable conditions under which dairy cows are placed for the transmission of the contagion from one to another, when herded together in close, badly ventilated byres, as they usually are during several months of the year. The passage of the contagion from the sick to the healthy may be effected either through the air they breathe, the food they eat, or the water they drink. Besides which, it may also enter the body by inoculation through broken or wounded surfaces. Of these several means of conveyance the air is unquestionably the chief—food and water standing next.

The tubercular parasite, like some other disease-producing organisms, may, under certain favouring conditions, live and retain its virulence outside the body for a considerable period. Even dried into dust it is still capable of resuming an active existence should it afterwards be brought into contact with a substance on which it can feed and grow, or enter the body of a susceptible subject. Cold does not destroy it, and immersed in water it continues to live for long periods. It is in a large measure to these vital attributes that tuberculosis owes its resistance to sanitary measures.

Symptoms.—Tuberculosis in cattle invariably pursues a slow and insidious course, and frequently commits serious ravages

even before disease is suspected to exist. Animals may even present all the outward appearances of health, lay on flesh and become fat while suffering from it in a most active form. The symptoms presented will depend very much upon the organ or organs attacked. In cattle the lungs are by far the most common seat of the disease, and it is to them attention is usually directed for indications of the malady. In the early period of the disease a cough is heard from time to time, and this is found to become more frequent and forcible when the patient is made to walk quickly or is slightly hurried, or when passing from the warm byre into the cooler air without, or walking on dusty roads. For a time there may be nothing more to attract attention. Sooner or later, however, the body begins to waste, the coat stares, the skin loses its suppleness, becomes dry and adherent to the ribs. There is tenderness across the loins, and some pain is shown when pressure is applied to the surface of the chest. The body temperature from time to time fluctuates, being sometimes normal, at others showing a rise from one to three or more degrees. As the malady progresses, the appetite fails, rumination is slowly and irregularly performed, and the stomach is liable to distention with gas. Milch cows fall off in their milk, which becomes thin and acquires a pale blue tint. The cough, at first dry, now gives out a moist rattling sound resulting from the expulsion of pus or "matter" and the *débris* of tubercles from the disorganising lungs. Much of this expectorated stuff swarming with organisms is swallowed, to set up new centres of disease in the bowels, and some is forced out of the mouth into the manger from which other animals may become infected. Looseness of the bowels sooner or later appears and leads on to diarrhœa, which is followed by rapid wasting and prostration. The patient ceases to lie down, the breathing now becomes short and laboured and painful, finally ending in exhaustion and suffocation.

Prevention.—To prevent the spread of tuberculosis, it is of the first importance that the diseased should be separated from

ıe healthy. In the opinion of the writer of this chapter this ıay be attempted by resort to the tuberculin test. Where this ıeans is not employed, all animals that habitually cough, and ll such as are unthrifty and waste without obvious reasons hould be isolated; the former to be fatted as speedily as ossible, and the latter should be got rid of. On no account re they to be allowed to mix with the healthy herd either ı byre or pasture. It is equally important that full and free entilation with ample air space be provided for all cows in onfinement, as it is mainly through atmospheric contamıation that the disease is spread. Animals with enlargeıents on their throats or udders, or suffering from chronic iarrhœa, as well as those that frequently go to the bull ithout effect, should be regarded as suspicious and dealt ith accordingly. Calves born of delicate cows should be laced on a healthy foster-mother to rear. Cows affected ith slowly growing cold swellings of one or more quarters f the udder are at all times suspicious. All such cases as re here indicated are subjects of possible danger, and should e drafted out of the herd without delay.

Anthrax.

This is an acute destructive disease of a contagious nature) which all farm animals are more or less liable, and from hich it may spread from one to another either through the ıedium of food or water. It is also communicable to man y inoculation, when it gives rise to "malignant carbuncle," r by breathing infected air, when it occasions pulmonary nthrax. Wool-sorters are frequently victims of the last orm of infection.

The virus or contagion consists of a minute rod-like rganism termed *bacillus anthracis*, which on entering the lood undergoes rapid multiplication, and in addition to locking up the minute blood vessels, also gives out a poisonous principle destructive to life. The reproductive power

and virulence of this organism exceeds that of any other contagion affecting our farm animals. Once a few of these invisible particles gain access to the blood, countless thousands are quickly developed, and a few hours is often sufficient to terminate a fatal sickness.

Infection is usually the result of consuming either virus-laden food or water. It is seldom if ever contracted as in man by breathing specifically contaminated air. Pigs, dogs and other flesh-feeding animals frequently become infected by eating anthrax flesh or the blood of anthrax patients. The incubation varies from thirty-six to fifty-six hours, and the disease runs its course in from twelve to forty-eight hours. In exceptional cases its duration may be shortened or prolonged.

Symptoms.—Anthrax invariably comes on suddenly, and the finding a dead animal is often the first notable feature of its presence. Where it is observed in the early period of the attack, the temperature of the body is found to have risen from three to five degrees. This is followed by sudden and extreme prostration, when the ears, head and tail are noticed to droop, and the animal wears a dull dejected appearance. It is indisposed to move, and walks when made to do so with a rolling gait. There is general trembling of the body and twitching of muscles. The coat stares, the back is arched, food is refused, and the animal stands alone from the rest of the herd. In many instances blood is discharged with the fæces, in some it is contained in the urine, and in others it flows from the nostrils. Occasionally swelling of the throat appears—this is a common symptom in the horse and pig.

Treatment.—In this, as in some other contagious affections, curative treatment offers no hope of success, and having regard to the great risk of multiplying and disseminating the contagion, which may live for long periods in the soil and manure of our homesteads, it is to the interest of the stock owner to destroy the stricken animals as speedily as possible.

Prevention.—Measures of prevention against an extension

of the disease and its reappearance on some future day, are of the first importance. In this connection the healthy should be promptly separated from the sick and transferred to a shed thinly littered with straw, where they should remain for five or six days. Each day they should undergo inspection by a competent veterinary surgeon, and in the event of no further case occurring, they may be passed out to a fresh pasture. In destroying animals already affected, no blood should be spilt. This may be accomplished by the injection of prussic acid, either into the lungs through the walls of the chest, or directly into the jugular vein. Whether animals are destroyed or succumb to the disease, the skin should not be cut, but the carcase must be removed entire to the place of burial. Before this is done the inlets and outlets of the body, mouth, anus, and genital passage are to be freely dusted over both inside and out with chloride of lime, and then plugged with wisps of hay soaked with carbolic acid; without this precaution the poison or virus may escape, while the carcase is being conveyed to the grave, and by contaminating the soil become a source of future trouble. Where a *post-mortem* inspection is desirable it should be made at the place of burial, and every particle of blood-stained earth should be afterwards shovelled into the grave. On the completion of the operation, the soil over and around the grave should be well saturated with carbolic acid solution and covered with lime, the grave being afterwards fenced round. All excrement from the diseased animal and litter from the stable it may have occupied should be burnt.

Ringworm.

Ringworm is a parasitic disease of the skin resulting from the presence of a minute fungus which buries itself in the epidermis or scarf-skin and draws its nourishment from the fluid which it causes to exude from the blood vessels. It is a contagious affection, and under favourable circumstances may pass from one animal to another, and also from animals

to man. Calves occupying close, damp, badly ventilated pens, and young stock in low condition are specially liable to it.

The ringworm organism commonly infesting the ox is a small cell-like body known as the trichophyton tonsurans. *Its mutiplication is effected by a process of budding.* This occurs in the following manner: a small globular mass projects out from some part of the circumference of the parent cell, soon to be set free and to lead a separate existence. This young offshoot then enlarges and repeats the same act of multiplication, and so on throughout each succeeding generation. The rapidity with which this is effected is governed in a great measure by heat and moisture, both of which in moderate amount are found on the animal body when in damp, overcrowded pens. The ringworm fungus is endowed with a high degree of vitality. It will bear drying to powder, and exposure to the severest cold, and to prolonged wet without suffering any impairment of its powers of propagation.

Symptoms.—The symptoms and progress of ringworm are very characteristic. It mostly invades the head and neck, perhaps for the reason that these parts of the body are more liable to contact than others. One or several small scaly pimples are the first observable signs of the disease. These gradually become larger and extend themselves in a circle or "ring" presently forming a round greyish-white scaly patch with raised edges, which may reach to the size of a shilling or half-crown. Should the disease go on unchecked, *they run into each other, forming large irregular scabby* patches. The affected part of the skin becomes thickened, the hairs stand erect and break off, or fall from their follicles, leaving behind a thick raised scaly crust. In course of time this falls away in particles, conveying with it the parasite in immense numbers to contaminate the litter and manure, through which it may reach cattle in the yards and elsewhere. Itching of the skin prompts the patient to rub the diseased parts against doors, posts, gates, and other

fixed objects; thus portions of the scab laden with fungi are deposited on them and transferred to healthy stock.

Treatment.—In this disease a cure is greatly facilitated by first removing the scurfy matter with soft soap and water, and then applying the remedy, which may consist of a solution of perchloride of mercury, or a strong solution of alum, tincture of iodine, ointment of white precipitate, or the tincture of perchloride of iron; any of these agents with judicious use proves effectual. After being dressed, the animal should be removed into fresh quarters and receive a generous diet. Care should be taken that the stable or shed is dry and well ventilated. The infected pen should be thoroughly brushed and washed down with a strong solution of alum, and afterwards lime whited. All the manure should then be removed, dressed with lime, and carted away from the homestead to be used on arable land, or if only small in amount it might with advantage be promptly burnt.

JOHNE'S DISEASE.

The symptoms of this disease are much the same as those of parasitic gastritis, but they usually become acute after the animal has calved. This wasting disease has been called by the name of its discoverer or the pathologist who first identified this particular form of enteritis in a cow. It is a chronic inflammation affecting the internal coats of the intestines in cattle. Almost invariably it is fatal. The diarrhœa may be temporarily checked, but the loss of condition continues, and in the end the animal becomes so weak that it is unable to rise. The duration of the illness is variable. A diagnostic has been discovered by Messrs. Twort & Ingram, of the Brown Institute, London. As no cure has been found, and affected animals are a source of danger to others kept in the same premises or pasture, it follows that the best course, when the disease has been certainly diagnosed, is to have the animal or animals promptly

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